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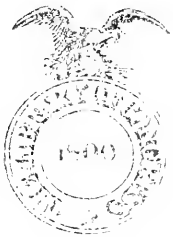
A SKETCH OF NORTH CAROLINA



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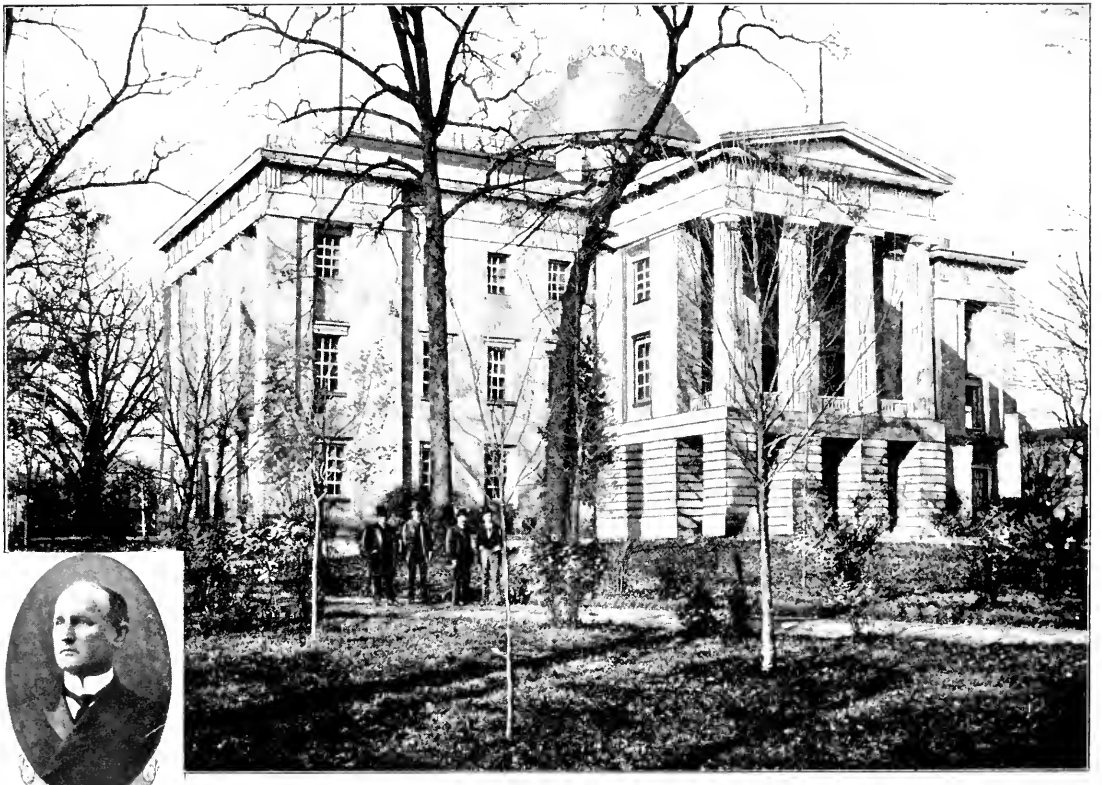

STATE CAPITOL.—RALEIGH.

A Sketch

. . . of . . .

North Carolina

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INTRODUCTION.

THE Sketch Book of North Carolina has been of necessity somewhat hastily prepared, and its publication delayed.

It is intended primarily to accompany the handsome exhibit the State, through the Department of Agricultures, is making at the Charleston Exposition, and to give information to those persons who may be attracted by the State's exhibit, or may seek to learn more of its resources.

It is expected also to distribute from the Department in Raleigh, copies of the Sketch Book to many enquirers from without the State, who are daily asking information of the opportunities offered in North Carolina for the industrious settler, the investment of capital and the seeker after health.

In 1893 the Department of Agriculture issued a Handbook, many copies of which were distributed from the Chicago Exposition. A few years later "North Carolina and Its Resources" was published. Both these publications are practically exhausted. That they have aided in the development of the State and in making North Carolina known more favorably and more justly to the country at large, there can be no reasonable doubt.

The present unpretentious little volume is what its name indicates, a Sketch Book. Many times as many pages would be required to write up fully the subjects treated of and others of interest and value relating to the State.

The Sketch Book is intended to fill only an immediate want in marking the rapid strides the State is making.

To the generous aid of President Geo. T. Winston and Professor W. F. Massey, and especially of Professor D. H. Hill, all of the A. & M. College; of Dr. Joseph Hyde Pratt and of Dr. E. W. Myers, of the State Geological Survey; of Professor C. F. Von Herrmann, of the United States Weather Bureau, and of the officials of the Department of Agriculture is due the credit of the work in the limited time allowed for its publication.

Presses The Lucas-Richardson Co.,
Charleston, S. C.

HISTORICAL.

THE first settlement made in the New World was made in North Carolina. This attempt at colonization was made by the illustrious Sir Walter Raleigh. In 1584, Raleigh sent out two boats, commanded by Philip Armadas and Arthur Barlowe, to explore as much as possible of the newly discovered continent. After a long voyage, these tiny vessels, on the 4th of July 1584, sighted the coast of North Carolina somewhere near Cape Fear. After beating about the coast until the 13th, these adventurous commanders anchored in the roads of Ocracock Inlet, near a beautiful island called by the Indians Wokokon. At midday on the 13th, after a prayer of thanks that the flag of England was about to float over broader realms, Captain Amadas took possession of the land in these words:

"We take possession of this land in the right of the Queene's most excellent majestie, as rightfull Queene and princess of the same, to be delivered over to the use of Sir Walter Raleigh, according to her Majestie's grant and letters patent, under her highnesse's great seale."

The Indians under the leadership of Manteo and Ganganames, welcomed the whites and tried to make their stay comfortable. After acquiring as much information as possible, the expedition returned to England, taking along as curiosities of the new land two Indians, potatoes, and smoking tobacco. Queen Elizabeth was greatly pleased with the report of Raleigh's captains, and named the land Virginia in honor of herself, the "Virgin Queen."

Raleigh, the next year, sent out a colony of men under Ralph Lane as governor to make a permanent settlement. This colony consisted of 108 men and crossed the Atlantic in seven little boats commanded by Raleigh's kinsman, Sir Richard Grenville. These colonists landed upon Roanoke Island on the 26th of July, 1585. There they built a few cabins, fortified them, and called their new home the "City of Raleigh." Owing to wild quests after gold and jewels, and to hostilities with the Indians, the settlers became reduced in number and disheartened in spirit. Hence when Sir Francis Drake, in one of his exploring expeditions, visited them with a large fleet, the entire colony determined to return to England. Thus, in 1586, the first English settlement in the new world was abandoned, and the City of Raleigh left tenantless.

Only a few days after the Lane colonists sailed away with Drake, a ship sent out by Raleigh arrived at Roanoke. This ship was loaded with abundant supplies, and had it arrived a few days earlier the colony would possibly have been perpetuated.

Not discouraged by failure, Raleigh sent out another fleet containing one hundred and fifty men, women and children. These colonists brought with them farm tools and came determined to make themselves a home in the new country. John White, the governor of this colony, disobeyed Raleigh's orders, and landed at Roanoke on the 22d of July.

Manteo welcomed this new body of Europeans. This great Indian was by order of Sir Walter Raleigh, admitted into the church and baptized as "Lord of Roanoke."

Among these colonists was Eleanor Dare, daughter of Gov. White. On the 18th of July, Mistress Dare gave birth to a daughter, the first English-speaking child born in America. In honor of the colony, this child was named Virginia Dare. After a stay on the island, Gov. White felt impelled to return to England to get supplies for the colonists, and to try to enlarge their numbers. Upon representations of White, unwearied Raleigh again loaded two ships to take aid to the Roanoke colonists. But for one reason or another, White was long delayed. When at last he reached Roanoke, not a sign of the colonists that he had left there could be seen. Three years had passed between his going and his coming, and on his return he found the City of Raleigh as overgrown and desolate as it had been at his first visit. Upon a tree the single word "Croatan" had been rudely carved. Before White's sailing for England, he had directed the settlers to carve upon a tree the name of any place that they might find it necessary to move to. No trace of the lost colonists was ever found, and White returned to England. It is said that Raleigh sent out at least five separate expeditions to search for the lost colony. With their disappearance, attempts at colonization of that part of the coast ceased. The attempts of Sir Walter Raleigh having signally failed, no further attempts at colonization were made for three-quarters of a century. In 1629, a charter was granted by Charles I of England to Sir Robert Heath of the Southern part of Virginia, latitudes 31 degrees to 36 degrees, under the name, in honor of that king, of Carolina. As Heath did nothing under it, a renewal was granted in 1663 to eight Lords Proprietors, and an enlargement to 36 degrees 30 seconds and 29 degrees, two years afterwards. The first permanent settlement in the limits of North Carolina was called the County of Albemarle. The Lords Proprietors appointed Governors of Albemarle, and then Governors, or Deputy Governors, of North Carolina until 1728. Seven of them then sold their interests to the Crown, Lord Carteret, afterwards Earl Granville, yielding the right of government, but retaining his one-eighth interest in the land of all Carolina. In 1744 he obtained a grant in severalty of about one-half of North Carolina, next to the Virginia line. The colony was therefore under the Crown from 1728 to the Revolution.

THE REVOLUTION.

North Carolina was most forward in resisting the arbitrary aggressions of the British Government. The first pitched battle against governmental tyranny was at Alamance, May 12, 1771. The first legislative body in defiance of the Royal Governor was at Newbern, August 25, 1774. The General Assembly had placed on its seal May 20, 1775, as the date of the first declaration of independence.

The skirmish at Lexington on April 19, 1775, although insignificant in itself, fired the American heart; the news of the encounter reached Charlotte, in Mecklenburg County, on the 19th of May following, and on

the next day, May 20, the patriots of Mecklenburg met in convention and declared the independence of the colonies. The cause of Massachusetts and of New England was theirs also, and a blow struck there in furtherance of British aggression must ultimately be repeated in North Carolina; hence this bold and patriotic action.

In the winter of 1775-76, North Carolina troops under Howe helped drive Lord Dunmore from Virginia. In February, 1776, the Tory Highlanders were crushed at Moore's Creek bridge. On April 25, 1776, North Carolina, first of all the colonies, empowered her delegates to the Continental Congress to vote for independence. In the next month her troops assisted to repel the British fleet at Charleston. In the same summer her militia under Rutherford, marching over trackless mountains, effectively humbled the hostile Cherokees. Her troops fought gallantly under Washington at Brandywine, Germantown and Monmouth and were among the picked men to storm Stony Point under Wayne. By their stubborn endurance and pluck her people thwarted Cornwallis' attempt to subjugate the Carolinas and Virginia. They furnished troops and leaders for capturing Ferguson at King's Mountain. They aided Green in crippling Cornwallis at Guilford Court House, and the virtual victory of Eutaw. After the Revolution, the State steadily increased in wealth and power. As the citizens of the State, however, did not engage to any appreciable extent in manufacturing, no large cities were built, and as they were selling raw instead of manufactured products, wealth did not keep pace with the growth in population.

The growth in population from the Revolution to the Civil War is shown by the following table:

Year.	Population.
1790	393,751
1800	478,103
1810	555,500
1820	638,829
1830	737,987
1840	753,419
1850	869,038
1860	992,622

THE CIVIL WAR.

North Carolina was not forward in adopting an ordinance of secession. The people by a small majority, in Feb. 1861, voted down a proposal to call a convention to consider Federal relations. But when coercion by the United States Government was resolved upon, a convention was called, and, on May 20th, 1861, an ordinance of secession was passed by unanimous vote, and the vote was at once sustained by volunteers from all over the State. The records of the War Department in Washington show with what devotion the State clung to the cause that it was so slow in joining. The Government tables of dead and wounded show that on the Confederate side, North Carolina lost more soldiers killed than any other Southern State, to wit: 14,522,

that the State also headed the list in numbers that died of wounds and that 20,602 of her soldiers died of disease. Her military population in 1861 was 115,369, yet she furnished 125,000 soldiers to the Confederate army. Since the close of the Confederate war, the State has made rapid strides in growth, in manufacturing, in wealth acquisition. The present population is 1,893,810.

This population is of a singularly homogeneous character. The immigrants in early days, Virginians mainly English, Pennsylvanians mainly Scotch-Irish and German, Scotch-Irish, Scotch Highlanders and Lowlanders, Swiss, French, Huguenots, Germans from the Rhine and elsewhere, have fused by inter-marriages or business or social communication into a homogeneous people of steady, orderly and friendly habits. The relations between masters and slaves were singularly free from cruelty on the one side and insolent spirit of rebellion on the other, And after emancipation there was little friction in the adjustment of the new relation of employer and employee.

GENERAL SKETCH.

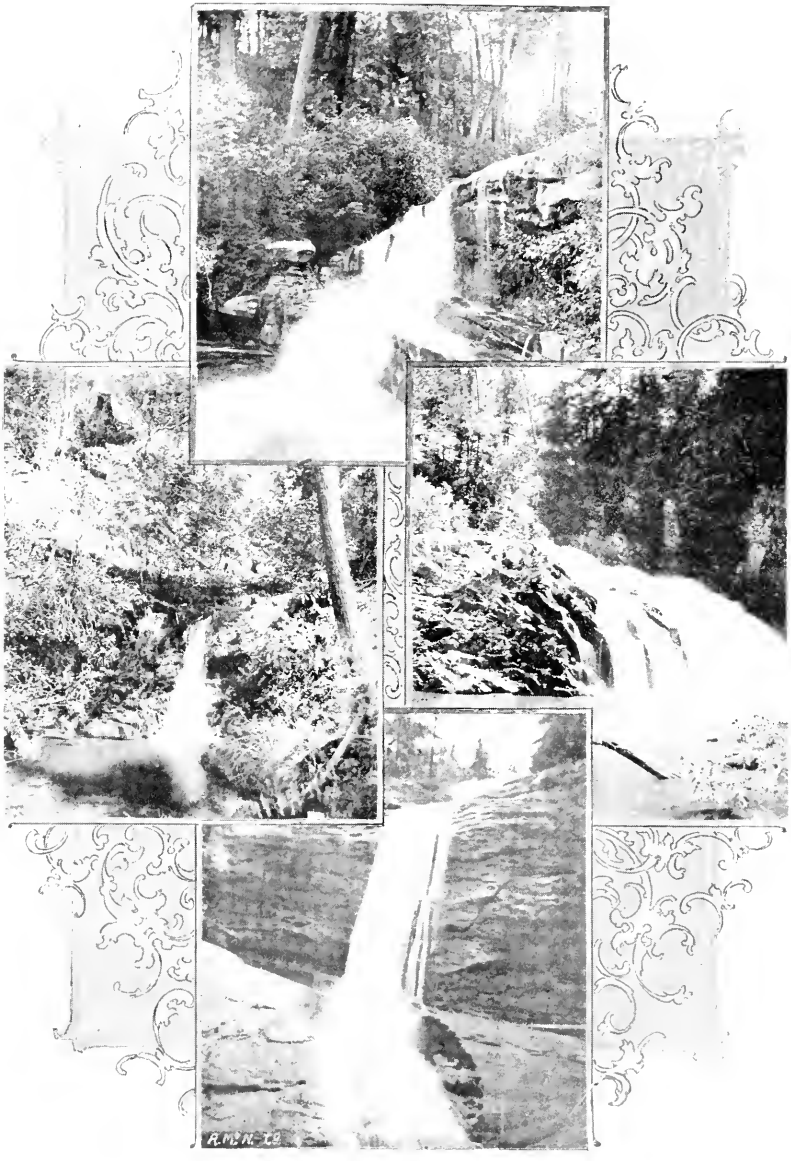
THE State of North Carolina is bounded on the north by Virginia, east by the Atlantic Ocean, south by South Carolina and Georgia and west by Tennessee. It is included nearly between the parallels 34 degrees and 36½ degrees north latitude, and between the meridians 75½ degrees and 84½ degrees west longitude.

The extreme length of the State from east to west is 503¼ miles; its average breadth is 100 miles; its extreme breadth is 187½ miles. Its area embraces 52,286 square miles, of which 48,666 is land, and 3,620 is water.

Its topography may be best conceived by picturing to the mind's eye the surface of the State as a vast declivity, sloping down from the summits of the Smoky Mountains an altitude of nearly 7,000 feet, to the level of the Atlantic Ocean. The Smoky Mountains constitute a part of the great Appalachian chain which here attains its greatest height; the greatest indeed, in the United States, east of the Rocky Mountains. This slope is made up of three wide extended terraces—if that term may be allowed; the first a high mountain plateau—distinguished as the Western or Mountain Section; the second, a submontane plateau, distinguished as the Middle section or the Piedmont Plateau region; the third, the Atlantic plain, distinguished as the Low Country or the Coastal Plain region, and that part from the head of the tides downward as the Tidewater section. From the first to the second section there is a sharp descent through a few miles only of not less than 1,500 feet; from the middle to the low country a descent of about 200 feet; through the two latter, however, there is a constant downward grade.

THE MOUNTAIN REGION.

Broadly considered, the mountain section may be treated as a high plateau bounded on the east by the irregular chain known as the Blue



FALLS ON PICTURESQUE TROUT STREAMS—MOUNTAIN REGION.

Ridge, extending across the State in a general direction from northeast to southwest, until, reaching the southeastern border of Henderson County, it turns to the west and forms for a long distance part of the southern boundary of the State, passing at length by a southwest projection into the State of Georgia, and again reuniting with the chain of the Smoky Mountains, to which it had made near approach on its entry into North Carolina in the counties of Ashe and Watauga.

The average elevation of the Blue Ridge is nearly 4,000 feet, though on the southern and northern extremities it drops to 3,000 feet; its lower gaps being a little above 2,000 feet over the main level of the Piedmont country.

The western boundary of this division is that long chain known under the various names of the Iron, the Smoky, and the Unaka Mountains, and forming the dividing line between North Carolina and Tennessee and enclosing with marked definiteness the plateau of Western North Carolina. The area of this division approximates 6,000 square miles. The plateau is the culminating region of the Appalachian system, and contains not only its largest masses, but also its highest summits. The elevation of some of the peaks is as follows:

Mitchell's Peak 6,711; Clingman's Dome, 6,660; Mount Buckley 6,599; Mount Love, 6,443.

In all there are forty-three peaks of 6,000 feet and upwards. There are eighty-two mountains which in height exceed 5,000 feet, and an innumerable number exceeds 4,000 feet. The general contour of all these mountains is gentle, the summits generally presenting smooth, rounded outlines. The mountains are covered with deep rich soil, and clothed with massive forests to their tops. There is little hazard in saying that there is nowhere in any of the other States an equal area of land covered with timber trees of such various kinds, and of such value. The walnut, tulip trees, (poplars) and oaks attain a size that would hardly be credited by one who had not seen them. The preservation of this magnificent forest is due to the fact that it has hitherto been inaccessible to transportation. Within the past few years much of it has been brought into connection with the markets of the world. One railroad line passes entirely through this section and another branching off at Asheville, and leading to the exteme southwest of the State, is now completed. Into the northwestern part of the State also a railroad has been completed and others projected.

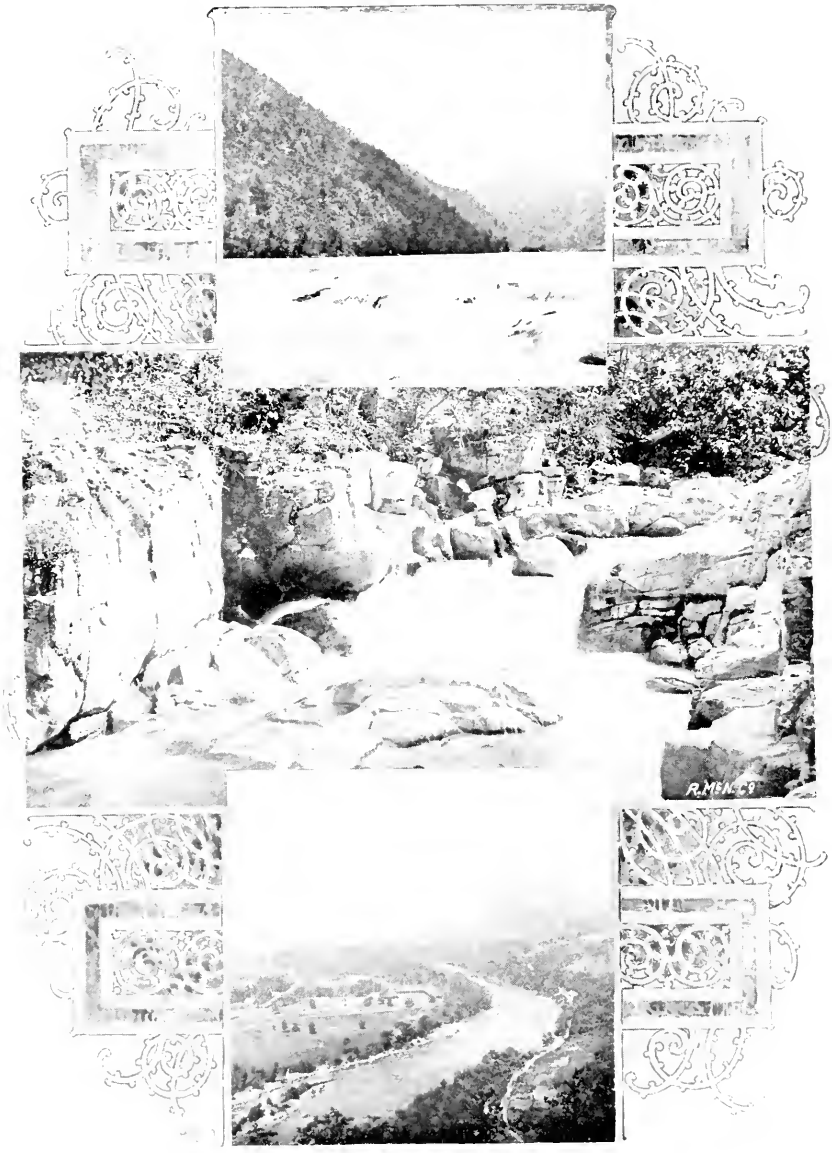
The cultivated productions of this section are the same as those of the Piedmont Plateau region, cotton and rice excepted. Its garden vegetables are the same, but the cabbage and the Irish potato grow here to a degree of perfection that cannot be excelled anywhere. Among the fruits, its apples are noted for size and flavor. Peaches and grapes grow well generally; but for their highest perfection, nature has made provisions by a suspension to some extent of her ordinary laws. Throughout the mountains in certain localities and at certain elevations, there are horizontal belts where frost is seldom known. Such localities are found not only in this section, but in the South mountains and in the Brushy range.

The climate of this section is delightful. Its summers are cool,

bracing and rich in ozone and the drinking water is delicious. The soils of the basins of the great rivers of this section and its mountain valleys are noted for their fertility. The capacity for the production of cereals and hay grasses is equal to that of any lands. As might be inferred from the heavy forest growth with which the entire surface is covered, the mountain sides are susceptible of profitable cultivation up to their summits.

The entire transmontane country is well adapted to stock raising. The cultivated grasses flourish everywhere with even ordinary care. But it is in the northwestern counties—particularly in the counties of Ashe, Alleghany, Watauga, Mitchell, Yancey—that all the conditions are found necessary for its perfect success. The soil throughout these counties is a deep rich loam, up to the summits of the mountains. The whole country is covered with a dense vegetation, amongst which will be found some of the largest timber in the United States, and as yet the forests are comparatively unbroken, because they have been inaccessible to market. The clearing of the timber is a work of some difficulty, but when that is done the labor of the farmer is rewarded with the richest crops. After two or three crops are taken off, the land, if suffered to lie at rest, springs up spontaneously in timothy, herds grass, and other rich pasture grasses; and once established, the grass perpetuates itself upon the land. Nor is an entire clearing necessary to establish the land in grass. If the undergrowth is removed, the trees thinned out, and the surface stirred and sown in orchard grass (Cocks foot), it flourishes luxuriantly even while the forest trees are left standing. Its capacity as a grazing country has long been known. But formerly the cattle were left to the resources of nature, which indeed, in such a country were abundant and rich. "Horses and horned cattle," says General Clingman, in one of his publications, "are usually driven out into the mountains about the first of April and brought back in November. Within six weeks after they have thus been put into the range, they become fat and sleek. There are, however, on the top and along the sides of the higher mountains ever-green and winter grasses on which horses and horned cattle live well through the entire winter. Such animals are often foaled and reared there until fit for market, without ever seeing a cultivated plantation." Of late, attention has been turned to the breeding of fine stock, and some herds of cattle and flocks of sheep are found there which will compare not unfavorably with those of any country. This country is already penetrated by one railroad, and others are in course of construction. When fairly laid open to railroad communication it will offer—besides its rich mining interests and timbers—one of the finest fields for cattle and sheep breeding and for dairy products that the Union presents.

The mountains are rich in various sorts of ores. Corundum abounds in Macon, Clay and several other counties; mica is abundant in Haywood, Yancey and Mitchell; iron of an unusual tenacity is found in the region around Canberry; copper is found in several counties.



VIEWS AROUND HOT SPRINGS—SOUTHERN RAILWAY.

PIEDMONT PLATEAU REGION.

The Piedmont Plateau region is intermediate between the Mountain region, already spoken of, and the Coastal Plain region, which extends to the ocean. It comprises nearly one-half the territory of the State. The hand of improvement is more visible in this than in any section in this State. Almost the entire region is now dotted over with thriving villages and towns. The homes everywhere indicate a high degree of thrift and comfort. An unusual proportion are built in modern style, and tastefully painted. Nestled amidst yards and gardens, enclosed with neat painted palings, flanked with orchards of fruit trees, in which a space is generally allotted to choice grape vines, they give abundant proof of ease, plenty, and, in many instances of no small degree of luxury.

It is in this section that the great water power of the State—estimated by the late State Geologist, Prof. W. C. Kerr, at three million horsepower—finds its greatest development and employment. It is through this section that flow the upper waters of the Dan, the Roanoke, the Tar, the Neuse, the Cape Fear, the Yadkin, and the Catawba, and their numerous affluents. All of those have been partially utilized by the erection of corn, flouring and saw mills in every neighborhood, and cotton and woolen mills on almost all of the rivers and their tributaries. Within the last few years the number of cotton mills has largely increased. Those erected lately are spacious buildings, and equipped with the best machinery. Within the same period all or nearly all of the older ones have been enlarged and new machinery put in. The fact begins to be more and more recognized that within the Cotton States there are advantages for the manufacture of that staple that cannot be found elsewhere. Here the cotton is at the door of the manufacurer, and the prime cost of the material is therefore less. Wages are less here than in the northern States, and a lower rate of wages here affords a more comfortable living than a higher rate there for the necessaries of life are cheaper, and less of food, clothing and fuel are required. Less fuel, too, is required for heating the mill in winter. The laborer can make substantial additions to his means of subsistence from his garden, which is always allotted here to the head of the family. Here there is no obstruction to machinery from ice in winter, and no greater suspension of work from drought in summer, for our rivers are as long as those of New England and have as many tributaries. The original cost of the site and of the building here is very much less than the same cost there. The force of these reasons cannot be long resisted, and, indeed, the phenomenal growth of cotton milling now observed in the State fully asserts the truth of the claims set forth.

The soil of this Piedmont section is very much diversified. This, added to favorable climatic conditions, offers great agricultural possibilities, and this section has an exceedingly wide range of productions.

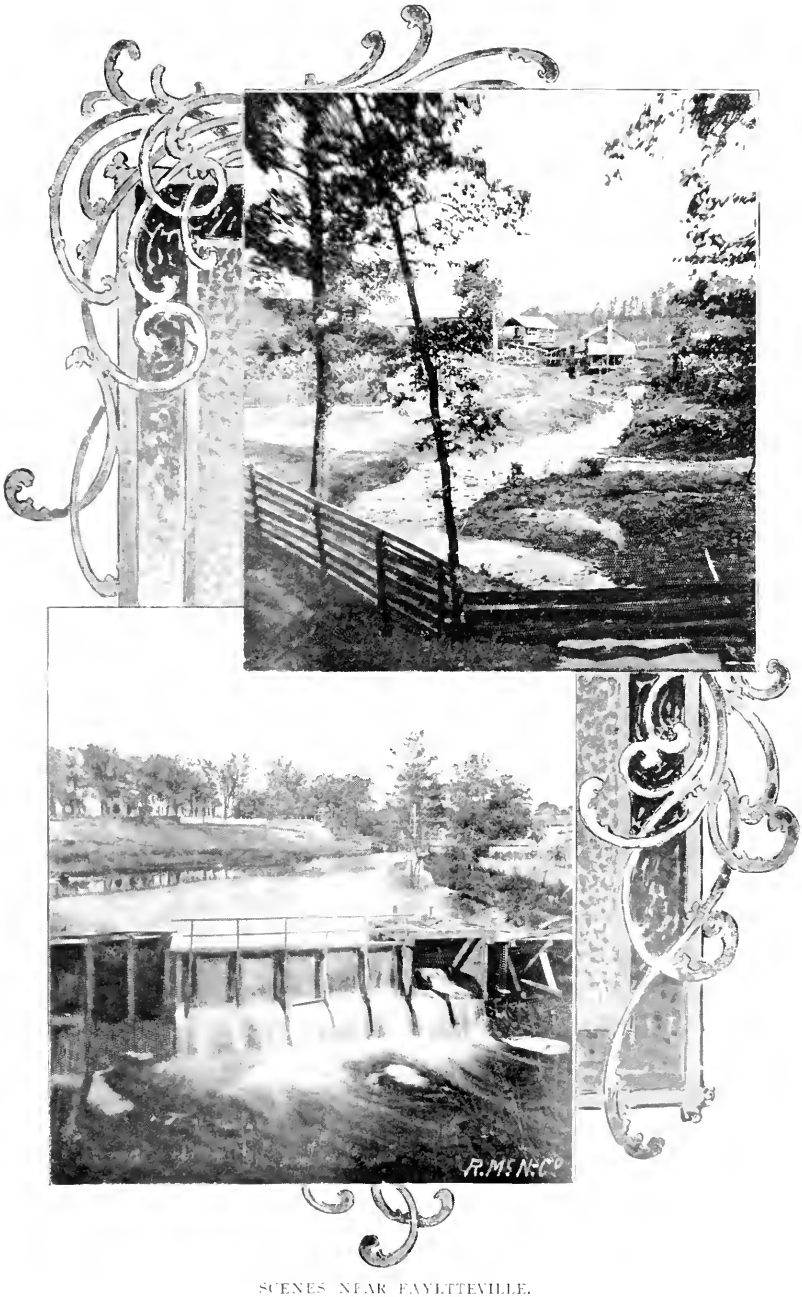
It is here that we find the largest area devoted to the cultivation of the most profitable varieties of tobacco, and it is here that the culture of cotton is largely extended and profitably pursued; and it is here also that all the cereals and all the grasses are cultivated in their

highest perfection, enlisting the leading agricultural interest of the population. Here also the fruits of the temperate zone find congenial home—apples, peaches, pears, cherries, the small fruits and grapes being unexcelled in excellence, variety and abundance. In this section are also widely distributed the richest veins and deposits of the valuable ores and metals, including the precious metals, gold and silver, iron, copper and lead, and the only two coal formations found in North Carolina. These ores, and the mining operations connected with them will be treated of in a chapter in this work. This region also abounds in varied and extensive forest wealth, which will be referred to in its proper place.

COASTAL PLAIN REGION.

The whole eastern portion of the State consists of a vast plain, stretching from the sea coast into the interior of the country, a distance of from one hundred to a hundred and fifty miles. Traversing this section from north to south are tracts of country which vary little from a perfect level. The Carolina Central Railroad has a stretch of one hundred miles where there is neither curve, excavation nor embankment. From east to west the surface rises by easy gradations at the rate of a little more than a foot to the mile. The rise, however, is not perceptible to the traveler. But though level in parts, it is in general relieved by slight undulations. Along its western border, as in the County of Moore, it attains an elevation of about five hundred feet.

This section is made up of beds of clay and sand, with vast quantities of shells imbedded in them. The soil varies in character to the extent that the one or the other predominates; and to the extent that the shells, when intermixed with it, have undergone decomposition. The upland soil is for the most part a sandy loam, easily accessible to the sun's rays, easily worked and very productive in the crops there cultivated. There are, however, extensive areas of country where sand predominates to such a degree that the surface to a considerable depth is a bed of white sand. Yet this kind of land is the favorite habitat of the long leaf pine. When cleared, it yields good crops of corn and cotton for a few years without manure, and always with slight help from proper commercial fertilizers, and considerable areas, as in Moore County, have been found to be valuable for small fruits and orchards. There are other extensive areas where clay enters so largely into the soil as to form a clay loam. The counties on the north side of Albemarle Sound—a very fertile tract of country—are examples of this class. The alluvial lands of this section—lands always in the highest degree productive from the fact that all the elements of fertility are intimately intermingled by having been once suspended in water—are of unusual extent and importance. The grain grown there supplies food not only for people of other parts of the State, but large populations in other States. There are also extensive areas when the marls of the tertiary formation come near the surface and increase the fertility of the soil. This is the case from the eastern part of Jones County to the Cape Fear River, and in portions of many other



SCENES NEAR FAYETTEVILLE.

counties. Another class of lands in point of fertility equalling any in the world is that reclaimed from some of the swamp and lake areas in the extreme eastern portion of this region. These lands seem to be well nigh inexhaustible. The cultivation of three-quarters of a century has made no change in their productive capacity. To the lands reclaimed from the borders of marshes—so frequent near the shore—the same remark may be applied. Throughout this entire section cotton, corn, oats, sorghum, peas, peanuts, potatoes, especially sweet potatoes, are the staple crops; the culture of tobacco has been lately introduced with success. Upon the rich alluvions and the reclaimed lake and swamp lands, corn, with peas planted in the intervals between the corn, forms the exclusive crop. Occasionally on the broad low grounds of the Roanoke, wheat is grown to a considerable extent. In the counties on the north of Albemarle Sound it is one of the staple crops. On the low grounds of the lower Cape Fear rice has long been the staple crop, and during recent years its culture has been extended northward along the low lying lands of the rivers and sounds. The upland variety of rice has been introduced within a few years past with entire success. This section is everywhere underlaid with marl—a mixture of carbonate of lime and clay formed by the decomposition of imbedded shells—sufficient in quantity, when raised and applied to the surface, to bring it to a high pitch of fertility and maintain it so.

All the cultivated fruits and berries grow here in great perfection with the exception of the apple. This, though by no means an inferior fruit, is yet not equal in size and flavor to that of the Piedmont Plateau and Mountain regions. Among the swamps the cranberry is found in profusion. The melons are of every variety and of peculiar excellence.

CLIMATE OF NORTH CAROLINA.*

IT will be conceded without question that the influence of climate on human progress is supreme, because its happy or adverse conditions affect all that relates to comfort, health, energy and success in the occupations of life. Those regions most abounding in fertile soil and exuberant vegetation, which favor the growth of many valuable productions of nature, often have those treasures closed against the efforts of industry by unfavorable climatic conditions, an excess of heat and moisture, and an air poisoned with miasma, leading to loss of vigor, health, or of life itself. On the other hand the frigid regions of the North are equally unsuited for the permanent abode of men. The greatest nations have all developed in the regions of the temperate zone, which possess the most variable climate. Variations of heat and cold, of moisture and dryness, within extremes not too great are essential to the best development of vegetable as well as animal life.

*From "North Carolina and its Resources" with statistical data revised to date.

Man especially requires the inspiration of the changing seasons; the summer, warm enough to assure the rewards of labor by the abundant yield of the fruits of the soil, the winter, with its bracing cold, giving a period of rest and renewal of vigor.

This is not the place for extended statistical details in regard to the unexcelled climatic features of North Carolina, which must be sought in other publications, but a few general statements will convey to the seeker for a new home the most important facts about which he will naturally seek information.

North Carolina lies on the same parallel of latitude as the central Mediterranean basin, that climatically most favored region of the globe. Though this position in the warm temperate zone determines the chief climatic features of the State, these are modified by various causes, most important of which are: the proximity of the ocean in the east and the mountain system in the west. The State is naturally divided into three regions: the Coastal Plain, the Piedmont Plateau, and Mountain. The effect of the prolongation of the first into the Atlantic is to give the climate of that region a more insular or marine character, the effect of the presence of the sea being to lessen the changes in temperature both diurnal and seasonal and to increase the amount of precipitation, Contrary to the prevailing impression the Gulf Stream has no influence on the climate of the coastal region. The annual mean temperature at Southport, situated in the southeast corner of the State, is 64 degrees. Here vegetation of semi-tropical origin, as the palmetto and magnolia, flourishes, and rice is cultivated. The decrease in annual mean temperature towards the north is only to 59 degrees at Coinjock and Weldon. The precipitation averages from 50 to 60 inches annually, and exceeds 60 inches only along the immediate coast from Hatteras to Lookout. The land is level and fertile, and the earlier and more rapid development of vegetation has lead to one of the most important industries of the State, that of truck farming. The shipments of truck and strawberries to northern markets begins before the middle of April.

On the other hand, in the mountain region the influence of elevation predominates; the land rises in summits higher than any east of the Rocky Mountains; the summers are cooler, the winters more severe, but the dryness of the air renders the climate more salubrious. As representative of this region, Asheville (elevation 2,250 feet) has a mean annual temperature of 54 degrees and an average rainfall of 43 inches. The white pine and the spruce, whose natural habitat is lower Canada, are abundant in the forests of the Blue Ridge. There are many picturesque and charming valleys, looked down upon by lofty peaks, which have a mild and agreeable climate. In this region occur the remarkable thermal or frostless belts where the season is known to be a month earlier in spring and later in autumn than in the valleys below them. The Blue Ridge acts also as a barrier to all except the most severe cold waves from the northwest, which frequently advance around the south end, effecting the Gulf States before they reach North Carolina. The heaviest rainfall occurs over counties just east or south of the Blue Ridge, from Linville southwest to Highlands.

Intermediate between these sections may be found all gradations in climate, as in soil, products and scenery, suited to every individual taste. The climatic conditions are favorable for the growth of a great variety of crops, as cotton, corn, tobacco and small grains as well as almost every kind of fruit and vegetable. Invalids may find returning health at many of the now well known summer and winter resorts, while the pleasure seeker frequents the watering places along the east coast. The Piedmont Plateau is the seat of the manufacturing industries of the State which have undergone such phenomenal development during the past decade.

To satisfy the natural demand for a demonstration of the facts of climate by figures, some records for the State at large are given in regard to the most important elements, temperature, precipitation and sunshine. The mean temperature for the State is 59 degrees Fahrenheit, and by seasons: spring 58 degrees, summer 76 degrees, autumn 60 degrees and winter 42 degrees. The autumn is warmer than spring in nearly all parts of the State; January is the coldest month of the year, but with no normal mean at any station even in the mountain region lower than 31 degrees Fahrenheit. July is the warmest month with no normal higher than 81 degrees Fahrenheit. The extremes in temperature for the State are considerable, as might be expected from the diversity of its physical features. During extremely cold winters such as occurred in 1873, 1886, 1893 and 1899, temperatures below zero may be experienced in the western half of the State, but during a normal winter the minimum temperature in the centre portion of the State will sink to 10 degrees or 12 degrees for brief periods. During a normal summer the maximum temperature, while frequently above 90 degrees, will hardly reach 100 degrees on more than two or three days. During the past half century the warmest years were 1887 and 1896, and the coldest 1893 and 1895.

The normal average precipitation for North Carolina is 52 inches, and this is divided among the three sections as follows: Eastern (coastal plain), 54 inches; Central (Piedmont plateau), 48 inches, and Western (mountain region), 53 inches. Long records show a belt of mimimum precipitation extending through the Piedmont plateau; at the same time certain valleys west of the divide also have small amounts. At some stations in the southern portion of the mountain region the normal annual precipitation exceeds 70 inches; at no station is less than 40 inches received annually.

One advantage must not pass unnoticed, namely that the rainfall is uniformly distributed throughout the year, and that during those months when crops require abundant moisture, the amount received is greatest. The largest averages occur in July and August, and the least in October and November during which the weather is especially favorable for the final work of the farmer, before the much needed rest for winter begins.

The average snowfall for the State is 5 inches (unmelted), and this small amount is a matter of considerable importance as regards comfort in winter. During severe winter snow sometimes occurs in larger amounts and may remain unmelted for a week or so, but during

a normal season the ground will not remain white for more than two or three days at a time. Opportunities for sleighing or skating are rare in North Carolina.

There remains to be considered one special advantage possessed by the State which is due to its position with reference to the prevailing course of cyclonic storms. The great path of these "weather breeders" is across the lake region, and thence northeastward down the St. Lawrence valley. North Carolina lies entirely outside of this path; of the total number of storms charted from 1874 to 1890 only 16 per cent. crossed North Carolina. These are, therefore, longer periods of pleasant weather than can be experienced in more northerly States.

The date of the advent of spring affords a very suitable criterion of the excellence of the climate of any region, for an early spring means a long crop season and the possibility of wonderful development in truck farming for the early northern markets. The earliest date for the advent of spring is Feburary 28th at Hatteras, the latest May 10th at Blowing Rock in the highest region of the Blue Ridge. The line for April 1st is fifty miles within the coast which it follows, and that for May 1st is very irregular and is chiefly governed by the topographical features of the great Smoky Mountain. Thus over the larger portion of North Carolina spring arrives during April.

GOVERNMENT AND TAXATION.

THE Constitution of North Carolina, like the Constitution of the United States, creates three co-ordinate departments of government—the Executive, Legislative and Judicial, and clearly defines the functions of each; establishes educational and penal institutions; directs who shall be liable to militia duty, and prescribes the rights of citizenship.

The right of citizenship in this commonwealth is acquired in three ways:

First. All persons who are born in the State and continue to reside within its borders are *ipso facto* citizens thereof.

Second. Citizens of other States of the Union become citizens by simply changing their residences to this State.

Third. Foreigners can acquire citizenship by becoming residents, declaring before the proper tribunal their purpose to become citizens, and taking the prescribed oath of allegiance.

The Constitution ordains that "every male person born in the United States, and every male person who has been naturalized, twenty-one years old, or upward, who shall have resided in this State twelve months next preceding an election, and ninety days in the county in which he offers to vote, shall be deemed an elector."

A recently adopted Constitutional amendment provides that "every person presenting himself for registration shall be able to read and write any section of the Constitution in the English language; and

before he shall be entitled to vote, he shall have paid on or before the first day of May of the year in which he proposes to vote, his poll tax for the previous year as prescribed by Article 5, Sec. 1 of the Constitution. But no male person, who was, on January 1st, 1867, or at any time prior thereto, entitled to vote under the laws of any State in the United States wherein he then resided, and no lineal descendant of any such person shall be denied the right to register and vote at any election in this State by reason of his failure to possess the educational qualifications herein prescribed: Provided, he shall have registered in accordance with the terms of this Section prior to December 1st, 1908."

The Constitution regulates taxation by providing that the General Assembly levying a tax shall state the object to which it is to be applied, and enjoins that it be applied for no other purpose. It establishes an equation between the property and the capitation tax by directing that the capitation tax levied on each citizen shall be equal to the tax on property valued at three hundred dollars in cash. The capitation tax is levied on every male inhabitant in the State over twenty-one and under fifty years of age, and shall never exceed two dollars on the head. The effect of this limitation upon the capitation tax restricts the tax on each hundred dollars worth of property to sixty-six and two-thirds cents. It further directs that the amount levied for county purposes shall not exceed the double of the State tax, except for a special purpose and with the approval of the Legislature.

The rate of State tax now levied for the present year is 21 cents on one hundred dollars valuation, besides 18 cents for school purposes, and 4 cents for pensions. In addition there are taxes levied on certain pursuits, industries and interests devoted to certain purposes, some in aid of the general school fund, some for interest on public debt.

The State Auditor's Report for 1900 shows that property amounting in value to $252,891,755.00 was listed for taxation. The taxes derived from this preperty were $587,932.10. In addition to this amount, special license and other taxes raised the total general taxes to $723,307.36.

The school taxes were as follows:

SCHOOL TAXES PAYABLE TO COUNTY TREASURER.

White polls, 188,396	$ 279,051.25
Indian polls. 654	971.49
Negro polls, 73,975	109,175.61
Railroad, telegraph, steamboat, canal property, $34,499,974	62,719.93
Bank stock, $3,520,940	6,523.23
Building and loan stock, $357,809	646.15
Listed by white citizens, $243,103,720	439,401.82
Listed by Indian citizens, $309,616	557.28
Listed by negro citizens, $9,478,399	17,225.95
Liquor dealers, first class	73,261.66
Liquor dealers, third class	526.00
Tax on dispensaries	1,200.00

From fines, forfeitures and penalties	$ 5,790.34
From other sources	2,879.27
Special school taxes	333.30
Graded school taxes	32,267.39
Total school taxes	$1,032.530.67

COUNTY TAXES.

County purposes	$ 763,387.33
Poor	38,616,74
Bridges and roads	125,724.68
Convicts and jails	38,428.11
Special county taxes	352,465.63
Total	1,318,622.49

The executive power of the State Government is vested in a Governor and a Lieutenant-Governor, elected by the popular vote for the term of four years, the Governor ineligible for two successive terms; an Attorney-General, a State Treasurer, an Auditor, a Secretary of State, and a Superintendent of Public Instruction, all of whom are eligible for re-election.

The legislative department, also elected by the popular vote, elected for the term of two years, and holding biennial sessions. The Senate consists of fifty members, and is presided over by the Lieutenant-Governor of the State, and the House of Representatives, of 120 members, presided over by a speaker elected from among the members of the same. The sessions are limited by the Constitution to sixty days. but may be prolonged on emergency, but with suspension of the *per diem* pay. Extra sessions may be called by the Governor should urgent cause make it necessary; but such sessions are limited to twenty days, but may be extended farther, under the limitations of pay that govern the regular sessions.

The Judicial department consists of a Supreme Court, presided over by a Chief Justice, and, in conjunction wlth four Associate Justices, forming the highest court in the State. The Justices are elected for a term of eight years, and are eligible to re-election.

The Circuit or Superior Court is composed of sixteen judges, elected by the people of a like number of districts, and are elected for the same length of term and the same eligibility to re-election as the Justices of the Supreme Court.

This State, in common with forty-eight other States, has a Bureau of Labor Statistics, the duty of which is to collect information upon the subject of labor, its relation to capital, the hours of labor, the earnings of laboring men and women, and their educational, financial and moral condition. It also collects general industrial facts, such as the number of manufacturing enterprises, capital invested, number of newspapers and other useful information. The office is directed by a Commissioner elected by popular vote.

Another adjunct of the State Government is the Corporation Commission. The Commission consists of three Commissioners also elected by popular vote.

AGRICULTURAL DEPARTMENT.

NORTH Carolina being essentially an agricultural State, it is but natural to find provision in the State Constitution for an Agricultural Department, which is fully sustained by legislation, wholesome and wise. The existence of the Department amply demonstrates the breadth and determination of the intelligence of the State to elevate its chief industry to its rightful dignity and prominence as an avocation. The Department has a peculiar and a particular work, a work devoted to the promotion of the interests of the agricultural masses; the broadening of their opportunities and guaranteeing them protection from the purchase of fraudulent fertilizers. The laws governing and directing the State Board of Agriculture have been changed from time to time, bringing it in closer touch with the people and rendering it more effective in the discharge of its duties relating to the fertilizer control. The Agricultural Department came into existence with the sanction of popular sentiment and under the shield and protection of the public law, and stands not only as a monument to the enlightened spirit of the age, but a beacon light of hope and encouragement to that great fundamental interest which, more than all others, has been the victim of neglect, the least consideration of statesmanship,

The Department occupies a building in the City of Raleigh, arranged so as to be specially adapted to its many uses and, in the prosecution of the work assigned to it it has done—and this will suffice to illustrate its usefulness—what is expressed in the words of another. "It has saved to the State thousands of dollars annually, it has induced investments of large amounts in the mines, forests and agricultural lands of the State, and has developed the oyster grounds, and the mineral deposits and coal fields of the State; it has gathered statistics and published valuable books descriptive of the whole State, and distributed them so wisely that this is among the best advertised States." Its greatest single act, perhaps was the organization of the College of Agriculture and Mechanic Arts. In its relation to the fertilizer trade it has been, and continues to be, of inestimable value to the farmer. For in the advancement of agriculture into the ranks of a science, so was there enormous application of the presumably scientifically compounded artifical fertilizers. Here was opened a wide and gaping door to fraud, which the Department was empowered to step forward and close. This has been done so vigorously, watchfully and effectively that fraudulent fertilizers are banished from the market, trustworthy brands have replaced them, and at the same time a great reduction in the cost has been made.

The duties of the Department are manifold and far-reaching. First

and foremost is that of fertilizer control. A small tonnage tax is levied and a very complete and thorough system of inspection has gradually been perfected, and careful analyses are made of every brand of fertilizer sold in the State. The work is pushed energetically during the rush seasons so that so far as possible the published analyses are in the hands of the public in time for use in that particular season for which the goods are being sold. The good herein accomplished for the farmers is simply incalculable. All grades of fertilizers are now, of necessity, uniform in quality and at least equal in valuable contents to the claim made by the manufacturer. The analytical work is done in the laboratories of the Department by the chemical division under the direction of the State Chemist, an officer of the Department.

Investigations in and the dissemination of information regarding all matters relating to agriculture, horticulture and the natural resources of the State are a large part of the Department's work, and here the different divisions co-operate under the direction of the Commissioner. These lines of work will be treated under the divisions to which the different features properly belong.

The Department is under the direction and control of the Commissioner of Agriculture, with the consent and advice of the Board of Agriculture, of which he is the presiding officer and executive head. The Board is composed entirely of practical farmers and its present composition includes some of the most progressive and brainy agriculturists in the State. Besides the direction of the Department as outlined above the Board has in its charge the State College of Agriculture and Mechanic Arts. This noble institution was originally a creation of the Board, and, after some experiments in regard to its controlling body, it has finally come back again under its original control, to the benefit of all concerned. The College itself is treated under a different head.

The Commissioner of Agriculture is a State officer elected by the people for a term of four years and is eligible for re-election. The present occupant of the office is the Hon. S. L. Patterson, of Caldwell County, a practical farmer and at the same time a business man whose wide experience in both lines, as well as in the legislative halls of the State, as a member for years past of the Geological Board and of the Board of Agriculture, make him peculiarly fitted for the office. In his hands is the general direction of the whole Department, which, for the sake of specializing the work in each separate line, is subdivided into divisions as described below.

Directly under the control of the Commissioner, his office force takes charge of the registration and inspection of the fertilizer trade and this entails an enormous mass of intricate detailed work during the busy seasons. In this office, too, are collected, tabulated and published the monthly crop reports and other statistics connected with the work. The Bulletin is edited, published and mailed from here and the accounts and other books of the Department kept in this office. Immigration work is under the direct control of the Commissioner, as is also the conducting of Farmers' Institutes, which are held all over the State as often as practicable.

Chemical Division—The State Chemist is the controlling officer here and under his direction is carried on the analysis of fertilizers as before mentioned. The Department, in co-operation with the National Government, is now conducting a widely extended series of soil surveys in the State and the direction of these, together with the chemical analyses of the many soil samples collected, also lies with this division. Under recent State Legislation the carrying out of the pure food laws rests with the Department and the State Chemist has control of the collecting and analyzing of the foods and food products sold within our borders. Many hundreds of these food analyses have already been published and much more work in this line is now under way.

Under certain proper regulations the analysis of minerals and ores and of the natural drinking waters is carried out here, free of charge to residents of the State, and this work is proving of much value.

Two newly established test farms are already doing good work and a large increase in this line is projected in the near future. These farms are conducted along the lines of practical usefulness rather than in scientific investigations of more remote or doubtful value and their work is in co-operation with the Department's laboratory and under the direction of the State Chemist.

Veterinary Division—Under the direction of the Commissioner the veterinary division has in hand the cattle inspection and the carrying out of the quarantine regulations. This is a matter of very great importance to the cattle interests of the State which can be better appreciated when it becomes known that the release of a county from the quarantine regulations of the infected area will cause a rise in the value of all cattle within that county of about half a cent per pound. The Veterinarian visits all areas in which the stock are affected with enzootic conditions in cattle and horse diseases and advises with the people regarding prevention and remedies. He examines and reports on all specimens submitted from diseased animals and in general looks after the live stock interests of the State at large. This division has already been of untold good to the State although of only comparatively recent creation.

Entomological Division—The State Entomologist's duties are twofold. Nursery inspection and the issuance of certificates of freedom of the stock from injurious insect pests on the one hand—(this work being under the direction of the Crop Pest Commission, of which the Commissioner of Agriculture is Chairman)—and general work in combatting the ravages of injurious insects throughout the State on the other, This latter work includes visits to all areas affected with any form of insect pest in an aggravated degree, so far as possible; the examination of any reported damage to crops from causes attributable to insect life and the suggestion of remedies and preventive measures, and the collection and dissemination of all information of practical value in combatting and preventing the great damages now done to almost all kinds of crops by insect pests. The examination and identification of specimens submitted, with notes regarding their character, is part of the regular routine and, among other things, a mapping of the State

is being carried out with regard to the distribution of each known pest as material for it comes to hand. Collections, both economic and general, are well under way and systematically added to as occasion serves.

Bacteriological and Botanical Division—The chief work in this division is the bacteriological examination of the drinking waters of the State. Besides, tests are made foi diphtheria, typhoid, tuberculosis and other contagious diseases for the local health authorities as well as for the State Board of Health. Fungoid plant diseases are studied and reported on and botanical specimens of all kinds identified for the public, free of cost.

Museum—This is described under a separate head, but beyond the regular administrative duties, the Curator is charged with the identification of all zoological specimens, other than insects submitted, as well as with the widely miscellaneous requests for information that are always received by an institution of this character. A large volume of information regarding the mineral and other resources of the State is also supplied through this division.

The Board of Agriculture has been the most potent factor in bringing the advantages of soil and climate and the natural resources of the State to the notice of the world. It has been faithful and true to the trust imposed by law and it has led in every move looking to the development of the State and the prosperity of its people.

The Department is in a sense, a "bureau of information" for the State, and all inquiries addressed to the Commissioner touching agriculture, lands, immigration, natural resources, or upon any subject inviting to investment in the State, will be promptly answered with the best information at hand.

THE STATE MUSEUM.

The State Board of Agriculture has enlarged and perfected the State Museum. This was first made possible by the wise provision of the Act of the Assembly in 1891 which provided that all non-perishable material used by the State in its presentation of resources at the great Columbian Exposition at Chicago in 1893, should revert to the Board for the purpose of adding to its then small collection. Thus has the Board had the first substantial aid from the State in this work, and very wisely has it been administered. Tne Board also has the hearty co-operation of the State Geological Survey in the museum work, especially in those divisions devoted to metalliferous ores, minerals and building stones.

The growth started by the Chicago Exhibit in 1893 has continued to the extent that two additions to the building have been added since to allow for it. The space now occupied is something like thirty-five thousand square feet and the growth in all lines is steady, healthy and constant.

The departments are—Geology and Mineralogy, 3 rooms; Agriculture and Horticulture, 3 rooms; Zoology and Commercial Fisheries, 2 rooms; History, 1 room; Forestry and Botany, 2 rooms; Ethnology and miscellaneous, 1 room, with work and storage rooms.

The entire second floor of the Agricultural Building is devoted exclusively to Museum purposes, the entrance being about the center of the Edenton Street front of the Building.

The rooms are handsomely furnished with oak cases, the floors comfortably carpeted and the whole steam-heated. In material and arrangement there is no collection south of Washington to compare with it. The contents of these several rooms are classified and arranged with reference to giving the greatest facility to the student, sight-seer or investor.

The Curator is Mr. H. H. Brimley, who also does the taxidermy work and modelling for the Museum.

GEOLOGICAL SURVEY.

THE North Carolina Geological Survey as at present organized was authorized by the General Assembly in 1891, and in May of the same year Professor Joseph Austin Holmes was commissioned as State Geologist. The object of the Survey is two-fold, as was expressed in the Act creating it: "The thorough examination of the nature and extent of the mineral and timber resources of the State." The work of the Survey has been steadily pushed forward and the results of its work and investigation are published in a series of bulletins and economic papers, which are sent to those desiring information on the special subjects treated, on receipt of the necessary postage for mailing them, sent to the State Geologist, at Chapel Hill, N. C.

The following is a list of the publications of the Geological Survey (some of which are out of print) and of those that are in preparation:

1. Iron Ores of North Carolina, by Henry B. C. Nitze, 1893. 8vo., 239 pp., 20 pl., and map. Postage 10 cents.

2. Building Stone in North Carolina, by Joseph A. Holmes and J. Volney Lewis. In preparation.

3. Gold Deposits in North Carolina, by Henry B. C. Nitze and Geo. B. Hanna, 1896. 8vo., 196 pp., 14 pl., and map. Out of print.

4. Road Material and Road Construction in North Carolina, by J. A. Holmes and William Cain, 1893. 8vo., 88 pp. Out of print.

The Forests, Forest Lands and Forest Products of Eastern North Carolina, by W. W. Ashe, 1894. 8vo., 128 pp., 5 pl. Postage 5 cents.

6. The Timber Trees of North Carolina, by Gifford Pinchot and W. W. Ashe, 1897. 8vo., 227 pp., 22 pl. Postage 10 cents.

7. Forest Fires: Their Destructive Work, Causes and Prevention, by W. W. Ashe, 1895. 8vo., 66 pp., 1 pl. Postage 2 cents.

8. Water Powers in North Carolina by George F. Swain, Joseph A. Holmes and E. W. Myers, 1899. 8vo., 362 pp., 16 pl. Postage 16 cents.

9. Monazite and Monazite Deposits in North Carolina, by Henry B. C. Nitze, 1895. 8vo., 47 pp., 5 pl. Postage 4 cents.

10. Gold Mining in North Carolina and other Appalachian States, by Henry B. C. Nitze and A. J. Wilkins, 1897. 8vo., 164 pp., 10 pl. Postage 10 cents.

11. Corundum and the Basic Magnesian Rocks of Western North Carolina, by J. Volney Lewis, 1895. 8vo., 107 pp., 6 pl. Postage 4 cents.

12. Drinking Water Supplies in North Carolina, by Joseph A. Holmes. In preparation.

13. Clay Deposits and Clay Industries in North Carolina, by Heinrich Reis, 1897. 8vo., 157 pp., 12 pl. Postage 10 cents.

14. Mica Deposits and Mica Mining in North Carolina, by Joseph A. Holmes. In preparation.

15. Mineral Waters of North Carolina, by F. P. Venable. In press.

16. A List of Elevations in North Carolina, by J. A. Holmes and E. W. Myers. In preparation.

17. Historical Sketch of North Carolina Scientific and Economic Surveys; and Bibliography of North Carolina Geology, Mineralogy and Natural History, by J. A. Holmes and L. C. Glenn. In preparation.

18. Road Materials and Construction. by Joseph A. Holmes and William Cain. In preparation.

19. Corundum and the Peridotites in Western North Carolina, by J. H. Pratt and J. V. Lewis. In preparation.

20. The Loblolly Pine in Eastern North Carolina, by W. W. Ashe. In preparation.

Economic Papers, No. 1, on the Maple Sugar Industry in Western North Carolina; No. 2, on recent road legislation in North Carolina; No. 3, on Talc and Pyrophyllite Deposits in North Carolina; No. 4, on the Mining Industry in North Carolina for 1900; No. 5, on the Mining Industry in North Carolina for 1901. In preparation. Postage, 2 cents in each case.

The progress of the work has been most gratifying and the appreciation of its usefulness is steadily growing among the people of the State.

PUBLIC CHARITIES.

THE State has three commodious hospitals for the insane. The oldest of these is located at Raleigh and can accommodate about four hundred patients. The hospital has one hundred and eighty acres of cultivated land on which it raises annually about $10,000.00 worth of products for its patients. The second hospital for white insane is situated in the mountain town of Morganton. The buildings there are very handsome and comfortable, furnishing rooms for about eight hundred patients. It has a large farm attached to it, and raises about $20,000.00 worth of products.

At Goldsboro is the asylum for the colored insane. It treats annually about 500 patients, and is very complete in its appointments.

The State maintains at Raleigh an institution for the white blind and also an institute for the deaf, dumb, and blind of the negro race. Both these institutions are comfortable and commodious and both are beautifully located. The white deaf and dumb are cared for in a separate institution at Morganton. This is a new institution and is provided with every comfort.

RELIGION.

THE laws and constitution grant no special favors to any creed or denomination, nor do they allow any interference with any man's conscience in religious matters.

The following table, carefully calculated by those in authority in the several denominations, will serve to show the names of the denominations and the number of communicants or members in each for the year 1895-96:

Methodist Episcopal Church South, (white)	129,040
Methodist Episcopal Church South, (colored)	17,000
African M. E. Zion, (colored)	121,000
Methodist Protestant	16,416
Methodist Episcopal Church, [Northern], (colored)	7,200
Quakers (or Friends)	5,466
Lutherans, (white)	16,000
Lutherans, (colored)	1,000
German Reformed Church	3,200
Moravians	3,829
Presbyterians	30,292
Associate Reformed Presbyterians, (white)	2,300
Christians, (O'Kellyites)	14,508
Episcopalians	9,000
Baptist, (Missionary, white and colored)	265,579
Baptist, (Anti-Missionary)	9,750
Baptist, (Campbellites)	6,000
Baptist, (Free Will)	20,081
Baptist, Free Will, (colored)	19,000
Roman Catholics, (white)	3,800
Roman Catholics, (colored)	200

NEWSPAPERS.

OWING to the fact that North Carolina has few cities, the number of daily newspapers in the State is comparatively small—there being only thirty (including morning and afternoon) in all. The commonwealth is, however, rich in well-conducted weekly, semi-weekly and monthly papers. These, amounting in number to one hundred and ninety-eight weekly, nineteen semi-weekly, fifty-two monthly, ten semi-monthly, four quarterly and one annually, reach all classes of the population.

POPULATION.

THE population of North Carolina is remarkably homogeneous. The entire foreign born population reaches only 4,492. The white population numbers 1,263,603. The negro population numbers 624,469. The aboriginal Indians still own a wide section of country in Western

North Carolina, and number 5,687. The increase in population since the census of 1890, has been 275,863 or 17.1 per cent. The total land surface of North Carolina is about 48,580 square miles; the average number of persons to the square mile is therefore 39.0.

The population, though at present so homogeneous, is sprung from many different nationalities. In 1659, Sir John Yeamans left part of an English colony on the lower Cape Fear.

In 1709, the Baron DeGraffenried, heading a colony of Swiss, settled at the mouth of the Neuse River, and founded the City of New Bern.

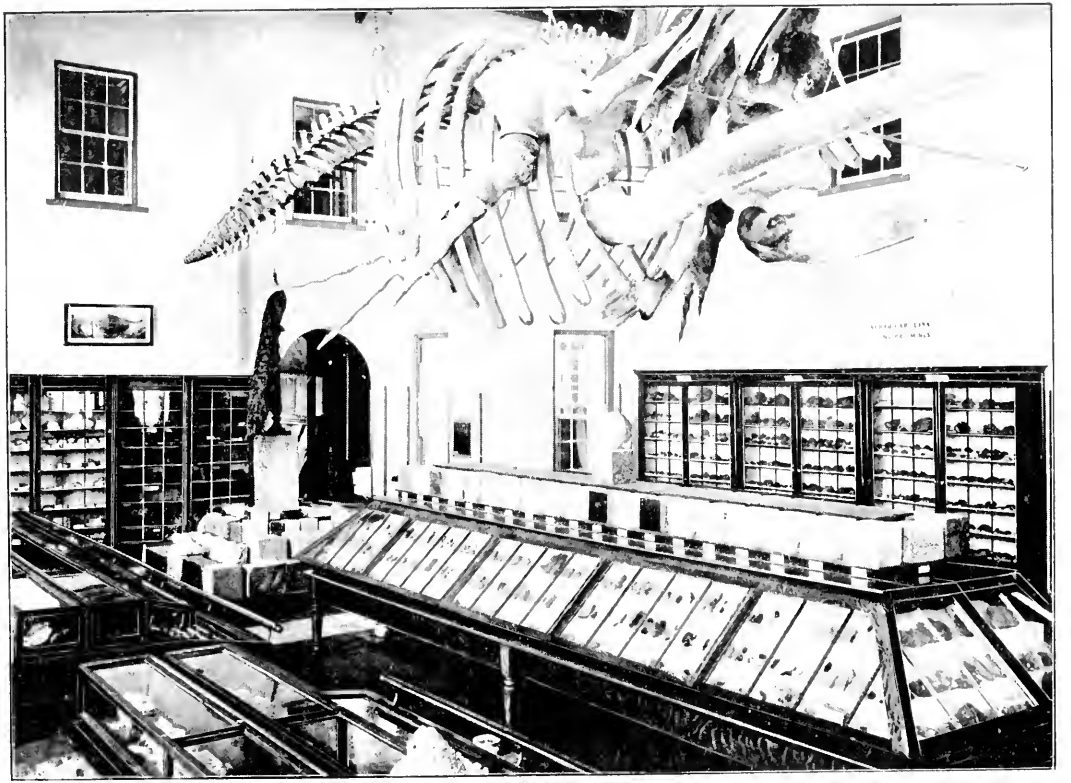
A small colony of French Huguenots, fleeing from persecution, settled in the same section. The Lords Proprietors also sent many settlers into the Cape Fear country.

In 1754, Count Zinzendorff founded a Moravian colony in the present county of Forsyth.

Perhaps the largest body of native Europeans coming approximately at one time, and constituting a distinctive foreign element, was the Scotch or Highland colony, which occupied the country along the upper waters of the Cape Fear, now known as the counties of Bladen, Cumberland, Moore, Robeson, Richmond and Harnett. These came, some voluntarily, most of them by compulsion, after the disastrous defeat of Culloden, in 1746. They have also blended with the other European families, but still retain in marked degree their national characteristics of piety, morality, and care of education.

The other chief elements of settlement were refugees from religious persecution in Virginia, who gradually filled up the northeastern peninsula around the waters of Albemarle sound and contiguous territory. In process of time, bodies of immigrants arrived from New Jersey and Pennsylvania, hearing of the rich lands and fine climate of the upper country. Some bodies of these were of German descent. A still larger body was Scotch-Irish. Both planted themselves in harmonious contiguity from Orange County on the east to Catawba County—as that county became eventually known—along the rich bottoms or the finely timbered uplands of the Eno, the Yadkin and the Catawba Rivers, and became the foundation of that population destined to prove in coming years its love of liberty, its hostility to oppression, its indomitable courage, its wakeful care of education, its intense religious fervor, its energies and its industry; a population, withal, so widely diffused as to have been greatly instrumental in forming the character of the North Carolinian by the domination of these leading traits and qualities.

Of the negro population it suffices to say that it is chiefly descended from the slaves captured in former years in Africa, and introduced into the South by English Dutch, and, in late years, New England slave-ships. Importation of slaves into North Carolina was very rare after the beginning of this century. The increase, therefore, has been from natural causes, a genial climate, a humane public system and the kindly temper of the owners, a temper softened as much by humanity —very often by affection—as it was influenced by interest. Through these combined causes, the negro population increased until it early attained the ratio to that of the whites it has held and still holds—about one-third of the whole.



A CORNER IN THE STATE MUSEUM.

Since the emancipation of the race, the policy of the State government, sustained by a just and humane public sentiment, has done everything consistent with the existence of insuperable and ineradicable ethnical antagonisms, to efface all the badges of former slavery. The negro has all the rights of the citizen, and is secured and protected in the exercise of them with the same jealous safeguard of the law as the white citizen. He testifies before the courts without question as to race competency; he accumulates, if he will, property, personal and real; he is admitted on the same terms with the whites to the practice of the learned professions; he has the amplest freedom in the exercise of his religious beliefs, and the most absolute control in his ecclesiastical affairs. His infirm, the deaf, the dumb, the blind and the insane, are cared for by the State in institutions, proportionately to the number of patients, as large, as well built, as costly, and as well supervised by competent heads, as those of the whites. His education is well provided for, and though he pays a little more than one-third of the poll-tax, and one-thirtieth of such property tax as is assigned to the maintenance of the school fund, his allotment of that fund is in proportion to population, not to that of race contribution.

The Indian portion of the population is confined to the mountain counties of Jackson, Swain and Graham. They are a remnant of the tribe which was removed in 1836 to the trans-Mississippi reservation, and which obtained the consent of the government to be exempted from the decree of expatriation. They were allotted in the counties above named a tract of about 100,000 acres, and left in the enjoyment of their former habits and customs. They are for the most part christianized, and speak both English and their native tongue. They are peaceable and generally law-abiding, but do not accumulate property, are only industrious enough to meet daily wants. There are about 1,800 of them, and they increase slowly.

Of the Croatans of Robeson County, little definite can be said. Their origin is involved in doubt, though it is clear that they form a mixed and distinct class of the blended Indian and white races. These people are provided by the State with their separate schools, and they take great interest in the education of their children.

GEOLOGY AND MINERAL RESOURCES OF NORTH CAROLINA.

GEOLOGY.

AS one travels across the State of North Carolina, from its eastern shores to its western boundary, it will be noticed that when about half the distance has been passed, there is left behind a region which is very level or gently undulating, the surface of which is covered with sand and loam soils, from which hard rocks are almost entirely absent; and there is entered another region the surface of which becomes more and more hilly until it culminates in the high mountains in the western portion of the State, and that the soil is mingled more

or less with hard, granitic, slaty rocks. It will also be noticed that the geological formations of the eastern half of the State are radically different from the central portions of the State, which are in turn different from the mountain regions.

There are three great physiographic divisions in the State which have been designated as the Coastal Plain, Piedmont Plateau and Mountain regions respectively, whose boundaries in a general way are rather sharply defined. The age of the rock formations instead of being contigious are widely separated; that covering the Coastal Plain being some of the most recent formations while those of the Piedmont Plateau are among the oldest, with the exception of the limited red sandstones of the Trias areas.

These three physiographic divisions are indicated in a general way on the accompanying map, together with the minor geologic rock formations of the Piedmont Plateau and Mountain regions. In the Coastal Plain region the formations have to be shown practically as a unit for the reason that the rock formations lie one above the other so that although there are at least five successive geological periods, only the uppermost is exposed except here and there in isolated places, and along the banks of such rivers as the Cape Fear and Roanoke, where these have cut down and left high steep bluffs, exposing a number of geologic formations.

The Coastal Plain region as indicated above, represents the most recent geologic formations composed of gravels, sands, clays, and marls arranged in nearly horizontal layers with the finer material nearer the coast. Along its eastern borders this region contains the sounds and bays, the sand dunes and ridges, the swamps and marshes, and other characteristics of a seashore region. Further inland it is gently undulating and has more of the upland and less of the marsh and towards its western boundary the swamps disappear almost entirely, the upland predominates and the surface becomes more undulating and even hilly in places. The soils toward the east are composed of fine sand and silt, while nearer the western border of the region they contain a larger proportion of coarse sand or gravel mingled with clay. The extent of this region is from Raleigh eastward to the coast, with its western boundaries roughly defined as extending from the western part of Warren through Franklin, Wake, Cumberland, Chatham, Moore, Montgomery and Anson Counties.

Along the western border of the Coastal Plain region there are occasional outcrops of hard granites and slates exposed along the beds of streams, where the once overlying sands and clays have been washed away. In the southeastern counties of this region limestone is exposed at the surface along the banks of streams in a large number of localities. This rock is of sufficient quality that it can in many cases be used for the making of lime, macadamizing roads, and perhaps in some cases for building purposes.

The Piedmont Plateau region, extending westward from the Coastal Plain region to the Mountain region, is about 125 miles in width and has an average elevation approximating 900 feet. Crossing this Piedmont Plateau obliquely are a series of geologic formations which are

in general parallel to the mountains and seashore. The most eastern of these formations is a narrow belt of Traisic sandstone and shales which has a maximum width of about 15 miles, and extends from Oxford in Granville County across the State through portions of Wake, Durham, Chatham, Moore, Montgomery, Richmond and Anson Counties. It is in these formations that the coal deposits of Chatham and Moore Counties, and the available beds of red, gray, and brown sandstone have been found. On the northeast of this sandstones, and between it and the Coastal Plain region there are considerable areas of granite extending across portions of Wake, Franklin, Warren, Vance and Granville Counties. To the west there is an older formation of metamorphosed slates and shists which cross through Person, Orange, Randolph, Montgomery, Stanley, and Union Counties, and has a general width of from 20 to 40 miles. Just west of this formation there is an area of granites, between which and the Mountain region are gneisses, probably Archean. Near the western boundary of the Piedmont Plateau region is the section of the two sandstone belts which is much more limited in area than the one of the east and extends from the Virginia line across portions of Rockingham and Stokes Counties, and has a maximum width of from 4 to 5 miles.

The Mountain region includes the Blue Ridge, Great Smokies, and the country between, which is cut across by the numerous cross ranges separated by narrow valleys and deep gorges. The average elevation of this region is about 2,700 feet above the sea level, but the summits of many ridges and peaks are over 5,000 feet. A considerable number of peaks reach a height of over 6,000 feet, the highest of which is Mount Mitchell with an elevation of 6,711 feet. Over the larger part of this region are to be found the older crystaline rocks, gneisses and granites, probably Archean, which are greatly folded and turned on their edges. On the western and eastern borders of this Mountain region approximately along the line of the Blue Ridge and Great Smokies there are two narrow belts of younger rocks consisting of limestones, shales, and conglomerates and the metamorphosed marbles, quartzites and slates. The age of these rocks is unknown and has been designated as the Ocoee. There has been no fossils found in any of these rocks. In this region as in the Piedmont Plateau, the rocks are decayed to a considerable extent and thus have produced deep soils which vary in character according to the rocks from which they have been formed. The soils are for the most part porous and fertile affording a luxuriant vegetation, in many places the slopes of the mountains being covered by heavy virgin forests. Where the rocks that have decomposed contain a large percentage of aluminous minerals, a large amount of clay has been formed.

That North Carolina is noted for its variety of minerals is an acknowledged fact and the continual discoveries of new localities of various minerals in commercial quantity has made it one of the foremost fields for exploiting and research by the prospector and mineralogist. Stimulated by the success of others and the remarkable discoveries already made, there is constantly a large number of men, either in their own interests or representing others, locating mines and prospects within its borders.

Minerals that were formerly supposed to be rare in their occurrence have, upon commercial demand arising for them, been found in considerable quantity. Thus zircon and monazite have been mined in North Carolina by the ton in response to the demand for them by the incandescent light manufacturing companies and Samaskite by the hundred-weight when needed for use in chemical research. Many new species have been furnished to science, some of which are among the most beautiful and valuable of the minerals.

From one cause and another, North Carolina has gained the reputation of containing a little of nearly all of the minerals but not much of any one. There may be some truth in this, inasmuch as minerals are found probably in greater variety in this State than in any other, with one exception. While many of these minerals are in very small amounts and some occur very sparingly, many others are in large quantities that make them of considerable economic importance. North Carolina has always been counted as one of the gold-producing States of the Union, and although, since the opening of the western fields, she is far from the lead in the quantity of gold produced there is still considerable being mined. Bonanzas in North Carolina gold fields are very rare, but properties that will pay a good interest on the money invested are not rare. There are also many good copper and iron properties, some of which, on account of the lack of railroad facilities, have not been producers until the recent increase in the price of both of these metals. Good silver properties are extremely rare, and more rare are those of lead and zinc. On the other hand of corundum, mica, (muscovite) talc and monazite there is no State that can excel North Carolina in these minerals.

MINERAL RESOURCES IN NORTH CAROLINA.

There are 200 species and sub-species of minerals that have been identified in North Carolina, some of which are new species that were first identified in this State; these are indicated in the list below by an asterisk.

1. Actinolite
2. Albite
3. Allanite
4. Altaite
5. Alunogen
6. Anatase
7. Andesite
8. Anglesite
9. Anorthite
10. Anthophyllite
11. Anthracite coal
12. Antimony
13. Apatite
14. Arsenopyrite
15. Arfedsonite
16. Argentite
17. Arragonite
18. Asbestos
19. Auerlite*
20. Augite
21. Autunite
22. Azurite
23. Barite
24. Barnhardtite*
25. Beryl
26. Biotite
27. Bismite
28. Bismuthinite
29. Bismutite
30. Bituminous coal
31. Bornite
32. Braunite
33. Breunerite
34. Bronzite
35. Brookite
36. Calamine
37. Calcite
38. Cassiterite
39. Cerargyrite
40. Cerolite
41. Cerusite
42. Chabazite
43. Chalcedony
44. Chalcocite
45. Chalcopyrite
46. Chalcanthite
47. Chlorite
48. Chlorotold
49. Chrysocolla
50. Chrysoprase
51. Chromite

52. Chrysolite(Olivine)
53. Columbite
54. Copper
55. Corundum
56. Corundophilite*
57. Covellite
58. Crocidolite
59. Crocoite
60. Cullasageeite*
61. Cuprite
62. Cuprosheelite
63. Cyanite
64. Cyrtolite
65. Deweylite
66. Diamond
67. Diaspore
68. Dolomite
69. Dudleyite
70. Dufrenite
71. Edenite
72. Enstatite
73. Epidote
74. Fergusonite
75. Fibrolite
76. Fluorite
77. Fuchsite
78. Garnet
79. Galena
80. Gahnite
81. Genthite
82. Garnierite
83. Glauconite
84. Gold
85. Goslarite
86. Göthite
87. Gypsum
88. Graphite
89. Gumite
90. Halite
91. Halloysite
92. Hatchettolite*
93. Hausmanite
94. Hematite
95. Hiddenite*(Var. of spodumene)
96. Hyalite
97. Hydrofergusonite
98. Hypersthene
99. Ilmenite (Minaccanite)
100. Iron (meteoric)
101. Itacolumyte
102. Jefferisite
103. Kämmererite (Var. penninite)
104. Kaolinite
105. Kerrite*
106. Labradorite
107. Lazulite
108. Leucopyrite
109. Limonite
110. Linarite
111. Lucasite*
112. Maconite*
113. Magnesite
114. Magnetite
115. Malachite
116. Marcasite
117. Margarite
118. Marmolite
119. Martite
120. Melanterite
121. Melaconite
122. Microline
123. Mitchellite*
124. Molybdenite
125. Molybdite
126. Monazite
127. Montanite
128. Montmorrillonite
129. Muscovite
130. Nagyagite
131. Niter
132. Octehedrite
133. Oligoclase
134. Olivenite
135. Orthoclase
136. Opal
137. Penninite
138. Phlogopite
139. Phosphuranylite*
140. Picrolite
141. Pleonaste
142. Polycrase
143. Prochlorite
144. Psilomelane
145. Pseudomalachite
146. Pyrite
147. Pyromorphite
148. Pyrolusite
149. Pyrophyllite
150. Pyrrhotite
151. Pyroxene
152. Quartz
153. Rhodochrosite
154. Rhodolite*
155. Rogersite*
156. Ruby Spinel
157. Ruhherfordite*
158. Rutile
159. Samarskite
160. Saponite
161. Scheelite
162. Schreibersite
163. Scorodite
164. Serpentine
165. Siderite
166. Silver
167. Sillimanite
168. Smaragdite
169. Sphalerite
170. Sperrylite
171. Spessarite
172. Spinel
173. Spodumene
174. Staurolite
175. Steatite
176. Stibnite
177. Stilbite
178. Stolzite
179. Succinite (amber)
180. Sulphur
181. Talc
182. Tantalite
183. Tenorite
184. Tetrahedrite
185. Tetradymite
186. Thorite
187. Thulite
188. Titanite (sphene)
189. Torbernite (Uranite)
190. Tourmaline
191. Tremolite
192. Troilite
193. Uraninite
194. Uranophane
195. Uranotil
196. Vermiculite
197. Vivianite
198. Wad
199. Wavellite
200. Wellsite*
201. Willcoxite*
202. Wolframite
203. Xanthitane
204. Xenotime
205. Zircon
206. Zoisite

Of this number 68 are minerals that are of economic importance, and of this 68 there are but 32 that are known to occur in the State in sufficient quantity to make them of any commercial value. Of this last number 23 have been mined during the past few years and are as follows: Gold (native,) Auriferous Pyrite; Pyrite; Silver, Argentiferous Galena; Bornite, Calcopyrite, Chalcocite, which are the copper ores; Magnetite, Hematite and Limonite, the iron ores; Corundum; Muscovite (mica,) Kaolin; Talc; Pyrophilite; (used the same as Talc) Monazite; Chromite; Graphite Zircon; Coal; and the gem minerals Beryl, Hiddenite, Amethyst, Ruby, Rhodolite and Almandite.

It will not be possible to take up in detail all of these minerals, but the more important will be briefly discussed.

GOLD AND SILVER.

The area in which gold deposits are known to occur is a broad one and embraces from 8,000 to 10,000 square miles of the middle and western counties. There are three types of occurrences of the gold ores, which are as follows:

1. In quartz fissure veins, carrying either free gold, or gold bearing sulphurets.
2. Impregnations of free gold and finely divided sulphurets in the county shists and slates.
3. Placer deposits.

The first gold mining in the State was confined to the placer deposits which are alluvial beds carrying free gold, from dust to nuggets that weigh 10 to 15 pounds. The gold in these deposits originated either in the fissure veins or in the country shists or slates, but these have become decomposed and disintegrated, and the products of alteration have been transported by water and deposited in the bed of the streams, which are now beds of gravel, and represent the original position of the stream. In following up the placer deposits, the veins have been encountered and where these carried free gold they were extensively worked but it is only in comparatively recent years that the sulphuret ores could be successfully treated.

With the improved processes that have been discovered for the treatment of these sulphide ores, very low grades can now be profitably worked, but it is the rich placer deposits and fissure veins, carrying free gold that have furnished the bonanzas in all gold fields. With conditions favorable to mining, and plenty of ore, a sulphide ore that carries $5.00 per ton can be profitably worked.

The first authentic account of gold having been found in the State was that of a 17 pound nugget on the Reed Plantation in 1799. This caused a systematic search to be made which resulted in the finding of a large number of nuggets. This stimulated search elsewhere and was the real beginning of gold mining in North Carolina. By 1825, gold mining was being vigorously carried on all along the eastern slopes of the mountains (Piedmont Plateau region). The exhaustion of the easily worked deposits and the California discoveries had a retarding influence on the gold mining, and at the outbreak of the war there was an end to all work. It is only in the past six years that there has been

a healthy revival of the gold mining in the State and the growth of this industry has continued to increase since that time.

There are in the neighborhood of 400 localities in the State that have been mined for gold and these mining districts have been more extensively developed than those in any other portion of the State. At the present time, however, there are not over 15 mines that are being worked, principally in Cabarrus, Mecklenburg, Davidson, Stanley, Montgomery and Rowan Counties; of these very few can be said to be steady producers, most of the work being preliminary development or prospecting, with irregular and spasmodic output.

These gold mines of North Carolina are distributed in three main belts, the Eastern Carolina, the Carolina and the South Mountain belts.

The Eastern Carolina belt covers an area of about 300 square miles in Warren, Halifax, Franklin and Nash Counties, and extends in a northwesterly direction from a point near the Thomas mine, 1½ miles northeast of Ransom's Bridge to and across the Tar River. The country rocks are diorite, chlorite shists, and gneiss. The district is characterized by a great abundance of narrow quartz veinlets from a twelfth to 1½ inches in thickness. Among the mines of this belt are the Thomas, Kearney, Taylor, Mann, Davis, Nick-Arrington, Mann-Arrington and Portis. The two latter are the most important of these. The Portis is located near Ransom's Bridge, in Franklin County, and the work done consists principally of surface sluicing and hydraulicing the soils and gravels to a depth of 5 to 30 feet, for the gold that has been deposited in these placer deposits as a result of the breaking down of the rocks and veinlets during the process of weathering. The Mann-Arrington is 5 miles southeast of the Portis in the northwest corner of Nash County, at Argo P. O. The ore body consists of quartz lenses up to 12 inches in thickness interlaminated in the shists. The depth of the shaft is 108 feet.

The mines of the Carolina belt can be roughly divided into three sub-belts: The slate belt which includes an area of metamorphic slates and shists extending in a general southwesterly direction across the central part of the State and ranging in width from 8 to 50 miles. The rocks are argillaceous, sericitic, and chloritic, metamorphosed slates and shists; sedimentary pre-Jura-trias slates, and ancient divitrified volcanic rocks. This would include the mines in Person, Alamance, Orange, Chatham, Moore, Randolph, Montgomery, Stanley and Union Counties with small portions of Davidson and Rowan Counties.

2. An igneous belt which lies to the west of the slate belt, and consisting of massive igneous plutonic rocks, extending across the State in a southwesterly direction, with a width of from 15 to 30 miles, includes the greater portion of Guilford, Davidson, Rowan, Cabarrus and practically all of Mecklenburg Counties. The actual area of the auriferous portion, however, is scarcely more than 1,000 square miles.

3. The King's Mountain belt occupies an area adjoining the igneous on the west, the rocks of which are crystaline shists and gneisses, and isolated bodies of siliceuos limestone. It includes the mines in Gaston, Lincoln, Catawba, Davie and Yadkin Counties.

The principal mining district of these belts is in the vicinity of Gold Hill, Rowan County. It is situated about 14 miles southeast of Salisbury in the southeast corner of Rowan County and extends into Cabarrus County on the south, and Stanley County on the east. The country rocks are chloritic and argillaceous schists, striking north 25 degrees to 30 degrees east and dipping 75 degrees to 85 degrees northwest. A diabase dike cut the schists near the village of Gold Hill. The ore bodies consist of certain portions of bands in the schists that are impregnated with auriferous pyrite and of imperfectly conformable lenticular veins and stringers of quartz. There are 6 well defined approximately parallel veins in this district known as the Randolph, Barnhardt, Honeycut, Standard, Trautman and McMakin.

The principal work being done in this district for gold is by the Whitney Reduction Company who are operating at and near the old McMakin mine. They have developed their mine by three shafts, the deepest one being 575 feet with cross cuts between them. A well formed ore body has been blocked out that assays very favorably. In connection with their mining this company are developing the water power at the Narrows of the Yadkin and will erect their stamp-mill at this point. The Gold Hill Copper Co. expect to begin work at the Barnhardt mine during the coming year. The Union Copper Co. are mining principally for copper, but obtain more or less gold and silver as by-products.

The Silver Hill mine located 10 miles southeast of Lexington and the Silver Valley, 5 miles northeast of the Silver Hill, are two mines that have attracted a great deal of attention on account of the apparent richnes of their ores. The country rock is chloritic schist striking north 35 degrees, east and dipping 57 degrees northwest, accompanied by an eruptive porphyrite. The ore is schist and quartz carrying a complex mixture of pyrite, galena, sphalarite (zinc blende) and chalcopyrite. The galena is rich in silver, and near the upper surface of the mines rich bunches of native silver were encountered. Some of the bunches of pyrite are very rich in gold, while others only carry a trace. The former of these mines has been worked to a depth of 660 feet by numerous shafts and extensive levels. The Silver Valley has only been opened to a depth of 120 feet.

In Montgomery one of the most noted mines is the Russell, which is about 3 miles northeast from Eldorado, and but a short distance from the Randolph County line. The country rocks are argillaceous slates both of soft and silicified types. In part at least these slates are sedimentary and have an available strike and dip. The ore beds consist of parallel belts in the slates impregnated with iron sulphurets (pyrite), and free gold together with some quartz stringers. The principal work at this mine consists of a big cut and open bed about 300 feet long by 150 feet wide and 60 feet deep. On the eastern edge of this cut is a shaft 150 feet deep from the bottom of which the ore has been stoped upward.

Some of the other principal mines in this county are the Sam Christian, Appalachian (or Coggins), Morris Mountain, Riggon Hill, Steel, Saunders, Marratock, Beaver's Dam, and Buck Mountain.

CHEROKEES—NORTH CAROLINA INDIAN RESERVATION.

The Reed Mine in Cabarrus County is about eleven miles southeast of Concord, and is of interest as being the site of the first discovery of gold in North Carolina. In 1799, a 17 pound nugget was found and in 1803 one weighing 28 pounds. The placer deposits of the Reed Mine have been very vigorously worked in former years and a considerable quantity of gold has been found. There are a number of promising gold properties in this county and among those which have been formerly worked are the Nugget, Rocky River, Buffalo, Phoenix, Furness, Tucker and Pioneer Mills Mines.

Mecklenburg has been one of the most important and active counties in gold mining of any in this State. The mines are distributed over almost the entire county, with Charlotte as a center. The more important mines are the Davidson Hill, (1 mile west of Charlotte), Saint Catherine, Rudisel and Clark, (2½ miles west of Charlotte), Palmer, Howell and Parks, (1 mile northeast of Charlotte), Brawley, (4 miles west of Charlotte), Arlington, (6 miles west of Charlotte), Capps, McGinn and Alexander, (8 miles northwest of Charlotte), Dunn, (7 miles northwest of Charlotte), Ferris and Ray, (8 miles southeast of Charlotte), and Surface Hill, (10 miles east of Charlotte).

The Rudisel Mine, which is 1 mile south of Charlotte, is perhaps the best known. In the upper part of the mine the rock is a silicified chloritic and argillaceous slate. At a depth of 200 feet this gives place to a crystalline eruptive rock. The ore bed consists of two parallel veins, close together and separated by a slate which varies in thickness from 2 to 6 feet. The maximum depth to which the mine has been worked is 300 feet. The mine carries very rich but highly sulphureted ores, and thus far no attempt has been made at concentration or treatment of these sulphurets.

In Gaston County the principal mines are the Oliver and Farrar, which are about 12 miles northwest of Charlotte, the former of which is reported to have been worked by some of the early German settlers before the Revolutionary War; the Duffie, McLean, Long Creek and King's Mountain (or Catawba).

The King's Mountain (or Catawba) mine is situated about 1½ miles south of King's Mountain, a station on the Southern Railway in the southwest corner of the county. The country rock is mica schist intercollated with lenticular layers of siliceous magnesian limestone. The ore beds are large lenticular chimneys or shoots of this limestone containing auriferous quartz and sulphurets. Five of these chimneys or lenses have been opened in this mine. The length of these lenses reach about 100 feet and in thickness they are about 20 feet, being separated from each other by the black graphitic slate. The mine has been worked to a depth of 320 feet.

The principal mining that has been done in the South Mountain gold region has been the hydraulicing and sluicing of the extensive placer deposits which are found in Burke, McDowell and Rutherford Counties, and it has only been within the last few years that any attempt has been made to work the quartz veins. Many of the gold bearing quartz veins are too narrow to justify any deep mining, but there are some that have been found of a much larger scale that give

promise of making profitable mines. The principal work now being done on these veins is a section 6 and 12 miles north of Morganton where two types of gold deposits have been encountered, one in which the gold occurs in the quartz veins and the other where it occurs in bends of the country rock either in the form of free gold or finely divided sulphurets. This district is perhaps attracting more attention than any other at the present time and has within the past two years furnished some splendid gold ore during the work of development. The principal mines in this South Mountain Valley are the Miller, Scott Hill, Pack's Hill and Baker Mines in Caldwell County; the Mill's property, Hancock, Hercules and Martha Mines in Burke County; Cain Creek, Brackettown, Huntsville and Vein in McDowell County, and the Golden Valley in Rutherford County.

There has been a little gold mining in Cleveland County and in the vicinity of Columbus, Polk County.

A custom smelter is being built a few miles south of Charlotte, which should make it possible for the reopening and development of many of the smaller gold properties in the State that are not able to support a smelter or mill of their own.

COPPER.

Copper ores have been found in considerable quantity at a number of localities, the principal ones being the Virgilina or Blue Wing district which extends across Person County into Virginia, the copper district of Gold Hill in Rowan County, and the Ore Knob Copper district of Ashe County. All the copper ore that is being mined is in the form of sulphides either chalcopyrite, the yellow copper ore, bornite, the variegated or peacock copper ore, and the chalcocite or gray copper ore. In opening up nearly all of these copper deposits the first ore encountered contained more or less malachite, the green carbonate of copper, and a little cuprite and tenorite, the two oxides of copper. Native copper has been found but very sparingly, some of the best specimens having been obtained from the Union Copper Mines at Gold Hill. In the Virgilina or Blue Wing district the largest and most extensively developed mine is the Holloway, which is 4 miles southwest of Virgilina, Halifax County, Virginia, and connected by a branch of the Southern Railway. Other mines of this district that are being worked are the Blue Wing, Morong, Copper World, Arringdale, Gillis, Yancey and Tingen.

In the Gold Hill district the Union Copper Company has spent a million dollars or more in the development of their property and in the erection of a concentrating plant and smelter. The ore is a low grade chalcopyrite, which exists in quantity, and is found along certain lines in narrow zones in chloritic and argillaceous schists and in slates. These zones are impregnated with the sulphides, chalcopyrite. pyrite and galena, and they probably extend to considerable depths. Until the middle of 1901 no ore had been smelted from this mine, but during the latter part of the year the smelter has been put in operation and the mine is now a producer of copper matte. About 12 miles to the south of this mine is the Cruse Mine which is being prospected and developed.

The copper mines at Ore Knob and Elk Creek, Ashe County, are being extensively developed.

The Blue Wing and Gold Hill Copper districts are established copper camps and are already producers of the metal and it is confidently expected that the production of copper from them, will continually be increased.

The Ore Knob district will also soon be added to the producing districts of the State.

IRON.

The iron ores are very widely distributed over the State and include magnetite (the magnetic oxide of iron), hematite (the red oxide), and limonite (the yellow oxide). Siderite or spathic iron occurs sparingly at a number of iron mines.

On account of the low price of iron, many points have to be carefully determined regarding the ore, as to whether it will make a profitable mine; these are, its chemical composition, mechanical structure, proximity to a supply of fuel, flux and water, and relation of the cost to the market price.

The first is by far the most important, for the first thing to determine is what percentage of iron the ore will carry, and how free it is from the injurious elements, sulphur, phosphorous, and titanium. There are a number of minerals that contain a high percentage of iron that will not make profitable iron ores; and thus a high percentage of iron in a mineral deposit does not necessarily mean a good iron ore.

Many attempts have been made to use the titanic iron ores, but they have resulted in complete failure and loss. The titanic acid of the ore passes into the slag making it very difficult of fusion and 1 per cent. of titanic acid in an ore will condemn it.

Sulphur is injurious in an ore for it cannot all be eliminated from the pig iron, and renders it red-short, that is brittle when hot; and phosphorous goes partially into the pig iron making it cold-short, that is brittle when cold.

Nearly all of the iron ores in North Carolina are low in sulphur, while those carrying titanium are usually confined to the magnetic ores.

The mechanical structure of the ore is also important for the value of the iron increases or decreases, according to the amount of gangue removed in mining the ore, and also the amount of cleaning that is necessary before the iron is ready for smelting, and the amount of foreign material that has to pass through the furnace. It is often of serious importance to determine whether it is cheaper to smelt the ore where is is mined or transport it to a furnace erected near the source of fuel and flux.

The history of iron mining in North Carolina dates back to as early as 1729, when small shipments of iron were made to England. The ore first mined was probably the bog ores near the coast. Mining of iron almost kept pace with the settlement of the western portion of the State. The remains of the old workings are still visible almost everywhere but they are no criterion either because they have been worked, that there is a quantity of ore or because they have been closed that

the ore gave out. They would all have to be examined to prove them one way or the other.

Some of the principal iron localities are, the magnetite ores of Granville, Stokes, Surry, Catawba, Ashe and Mitchell Counties; the limonite ores of Chatham, Gaston and Cherokee Counties, and the hematite ores of Granville County.

The iron ores are confined principally to the Piedmont Plateau and Mountain regions. Geologically the magnetites and hematites are confined almost exclusively to the crystalline rocks. Some limonites are also found in these rocks as well as in the Ocoee formation of Madison and Cherokee Counties. Limonite ores (bog iron ores) are also found in the more recent formations of the Coastal Plain region.

The most noted iron mine in the State is the magnetic iron mine at Cranberry, Mitchell County, which is at the terminus of the East Tennessee and Western North Carolina Railroad. The ore body consists of an immense lens of magnetite that has associated with it, hornblende, pyroxene, epidite, quartz, feldspar, calcite, garnet, zircon, allanite, serpentine, etc., in varying porportions. The ore is distributed in irregular masses through the gangue and at times intimately associated with the same in thin bands. The thickness and extent of these bands are variable, from a few inches to more than fifty feet.

MINOR ECONOMIC MINERALS.

Of the minor economic minerals that occur in commercial quantity in the State, the most important are, corundum, mica, talc, monazite and kaolin, and they occur in as large quantity in North Carolina as in any other State.

CORUNDUM.

Corundum is a mineral that was formerly supposed to occur but sparingly in nature but is now known to be quite wide in its occurences.

There are three names in constant use to designate its varieties: 1. Sapphire. which includes all of those corundums that are transparent to semi-transparent, of whatever color. 2. Corundum, including the translucent to the opaque, of all colors. 3. Emery, which is a mechanical admixture of corundum and magnetite or hematite. The last two varieties are those used in the arts for abrasive purposes; the emery being used in very much larger quantities than the corundum. It is of course the presence of corundum in the emery that gives it its abrasive qualities and makes it of commercial value, and the abrasive efficiency of the emeries will vary according to the percentage of corundum.

Any corundum that is transparent is brought under the head of sapphires, although many of these have distinct names in the gem trade. These are taken up under the head of gems.

The corundum gem or sapphire localities are usually distinct from those of corundum, although some very handsome gems have been found in some of the mines where corundum was mined for abrasive purposes, notably the Corundum Hill, at Cullasaja, Macon County.

Corundum as it is mined for abrasive purposes, occurs as sand,

crystal or gravel and block corundum, sometimes all three types being found in the same deposit. The sand corundum consists of small grains, crystals or fragments of mineral scattered through the vein. The crystal corundum consists of crystals up to three inches in length. Often these crystals have parting planes so thoroughly developed, that they often cause the corundum in crushing to break up into regular rhombohedrons, this continuing even to the finer sizes, which causes the grains to break down when in use. This continued regular breaking destroys the cutting efficiency, which is dependent on its irregular fracture, which produces the best cutting edge.

The block corundum often occurs in masses from ten to a thousand pounds in weight of almost pure corundum. Then again it occurs in large masses intimately associated with hornblende, feldspar, etc., making a very tough and difficult rock to work. Often the only way to break the masses is to build fires over them and then to suddenly cool them by pouring water upon them. The parting planes are at times very noticeable in the block corundum and are detrimental to the commercial product in the same way as to the crystal corundum.

There is a constant demand for corundum, more at the present time than is being supplied, and this has caused more thorough prospecting to be undertaken.

Although there are over sixty mines or localities known where corundum occurs, which extend over a considerable portion of the western part of the State, it is at present only known to occur in commercial quantity in the four counties, Clay, Macon, Jackson and Transylvania.

These corundum deposits are unquestionably of great economic importance to the State and considering the energy with which the industry is now being pushed it will be but a short time when the corundum will be bringing a considerable income into the State.

The principal mines are the Corundum Hill, at Cullasaja, and Mincey at Ellijay, Macon County; the Buck Creek or Cullakeenee, at Buck Creek, and the Scaly Mountain, in Clay County; the Sapphire, Socrates, Bad Creek and Whitewater, near Sapphire, and the Caney Creek, in Jackson County; and the Burnt Rock and Brockton in Transylvania County.

GARNET.

This mineral has also been mined in the State for abrasive purposes, the principal mines being the Sugar Loaf, near Hall, and the Pressley, near Speedwell, Jackson County.

MICA.

It is the varieties of mica known as muscovite and phlogopite to which all the commercial mica belongs; and in North Carolina it is the muscovite mica that is commonly found. It is very widely distributed, being a component of many of the crystalline and sedimentary rocks. When, however, it occurs in blocks or masses which can be split into sheets an inch or more in diameter, it has a commercial value, which increases with the size of the cut sheets that vary from

1x1 to 8x10 inches. The mica which is not capable of being cut into sheets is ground to a flour and used in the manufacture of wall papers; for lubricants, etc.

The deposits of commercial mica occur for the most part in pegmatitic dikes or veins, which are found in hornblende and micaceous gneisses and schists. These dikes or veins, which vary in thickness from a few inches to several hundred feet, are often very irregular and have arms or "veinlets" branching off from them in many directions.

In character these pegmatitic dikes are very similar to a granite and have sometimes been called "coarse granite," and if we could conceive of the constituents of the granite being magnified a hundred times or more, we would have an appearance that was very similar to a pegmatitic dike. These dikes consist of quartz, feldspar and muscovite mica in varying proportions. In some portions of the dike or vein the quartz and feldspar are nearly equally distributed, while in others some time one and again the other will predominate. Feldspar has been observed that has crystalized out in masses of more than a ton in weight, and well developed crystals of this mineral have been observed that were three by one and one-half feet.

In appearance these mica veins are also very variable. Sometimes the feldspar, quartz and mica have separated out in rather small masses while at others they are separated out on a much larger scale. As far as I have observed the occurrence of mica, the veins that yield the best commercial mica are those in which the three minerals have crystalized out in the larger masses. Where the feldspar and quartz are rather small the mica is apt to be small and often is of poor quality.

All the mica veins do not carry commercial mica, and usually the dikes two feet and less in width are barren of mica that would have a commercial value. Still, on the other hand, all the wide veins do not carry a mica that is of commercial value, for in some the mica is in such small crystals and blocks that sheets can not be cut of over an inch or two in diameter.

Regarding the mica itself as it occurs in the vein, it is usually in rough crystals called blocks or books, distributed sometimes nearly evenly in the vein and at others nearer the contact of the vein with the country rock. These blocks have at times been converted into what is called ruled mica, the mica being cut into narrow strips whose edges are parallel to the intersection of the prism and base edges of the crystal.

The principal deposits of the mineral are in Mitchell, Yancey, Jackson, Haywood and Macon Counties, the two former having the larger proportion. In Mitchell County there are 66 and in Yancey, 45 mines.

These mines have been worked for the most part by crude methods but even under these conditions, the Clarrissa, Sinkhole, Hawk, Double Head, Spread Eagle, Drake and Cloudland mines in Mitchell County; the Ray mine in Yancey County, the Big Ridge and Shiny mines in Haywood County; and the Iola, Burningtown and Raby mines in Macon County have produced collectively, considerably more than a million

dollars worth of mica, It is not unreasonable to suppose that under more favorable conditions the supply will be greater than what it has been in the past. Many of these old mines are being reopened and worked with considerable success. North Carolina mica is still, as it always has been, superior to any other in the world,

TALC AND PYROPHYLLITE.

The demand for talc and the similar mineral pyrophyllite is constantly increasing and this is causing a considerable interest to be centered in the North Carolina deposits of Swain and Cherokee, and Moore and Chatham Counties.

The properties of these minerals that make them suitable for the purposes for which they are to be used, are their extreme softness (being among the softest minerals known); their purity or freedom from grit; their stability; and their smooth, slippery touch.

When the talc is of sufficient compactness, it is sawed into pieces of various shapes and sizes, and into different styles of pencils. The larger proportion of the talc and pyrophyllite mined is ground to a flour, similarly as mica, and used in the manufacture of talcum powder, in wall paper, as the basis of many lubricants, in paper, and in the manufacture of some of the cheaper varieties of soap.

The talc deposits of Swain and Cherokee Counties are found in connection with the marble formation of this section of the State. What was formerly supposed to be a regular vein of the talc was probably a series of pockets of this mineral of varying thickness, lying for the most part directly between the marble and the quartzite, although at times they are entirely enclosed by the marble. None, however, have been observed that were enclosed by the quartzite. These pockets, which resemble in shape flattened lenses, always follow the dip of the strata in which they occur, and are therefore encountered in all positions from horizontal to vertical.

The pyrophyllite deposits are located in the extreme north central portion of Moore and the south central part of Chatham Counties, and can be traced across the country for a distance of eight miles. The principal mining that has been done is near the boundary between the two counties in the vicinity of Glendon, Moore County. They are associated with the slates of this region but are not in direct contact with them, being usually separated by bands of siliceous and iron breccia, which are probably 100 to 150 feet thick. These bands of breccia contain more or less pyrophyllite, and they merge into a strata of pyrophyllite schist. Between this and the massive beds of pure pyrophyllite there are very often small seams of quartz and larger lenticular quartz masses several feet thick.

The beds of this mineral are not entirely of commercial quality, but there are bands of the pyrophyllite that are highly siliceous alongside of those that are entirely free from grit. Although the general appearance of the waste and good material is very similar, they can readily be distinguished by the touch, and can readily be kept separate by hand cobbing.

The principal talc mines in the State are the Hewitt and Nantah-

halla in Swain County and the Hillyer in Cherokee County. Of the pyrophyllite mines the Snow, Womble and Rogers Creek are the largest and are all in Chatham County.

MONAZITE.

Monazite is one of the minerals that was formerly considered to be rare, but when a commercial use arose for it, there were many places found where it occurred in quantity. The first localities where it was proved to be in commercial quantity were in North Carolina. There is now an active industry in the mining of this mineral in Burke, Cleveland, Rutherford and McDowell Counties. The value of this mineral is in the percentage of thoria (1 to 10 per cent.) that it contains. This is extracted from the mineral and used in the manufacture of the cylindrical hoods for the Walsbach incandescent gas lights.

Monazite is an accessory constituent of eruptive granitic rocks, and gneisses derived from them. By the alteration and erosion of these rocks the monazite, which is a heavy mineral, has been deposited in the gravels of the streams near where they originated and have formed beds of gravel or sand. It is these beds of monazite sands that have been extensively worked for this mineral. Among the associated minerals found with the monazite in these sands are: zircon, xenotine, fergusonite, rutile, ilmenite, magnetite and garnet.

The best sands, that is those containing the largest percentage of thoria, are found in Burke and Cleveland Counties. Some of especially high grade have also been reported from McDowell County. One company is now working the partially decomposed granitic rock that carries the monazite. The rock contains but a small percentage of this mineral and it will be interesting to note whether it can be profitably recovered.

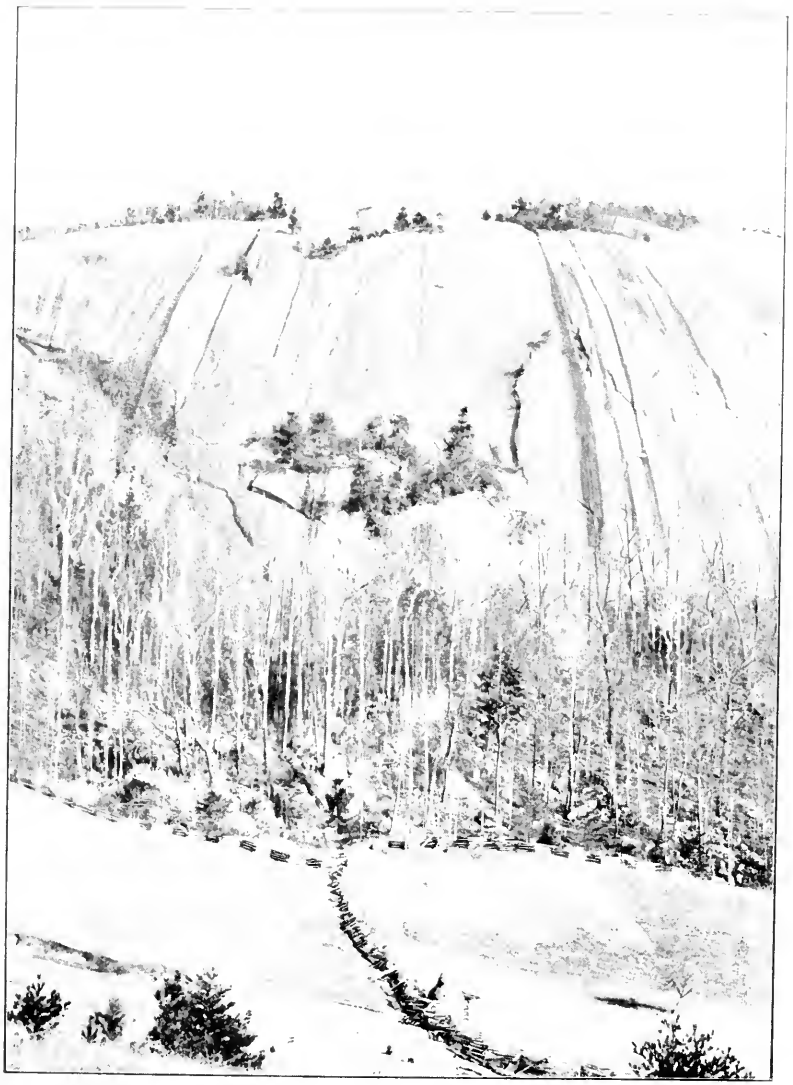
This mineral at times occurs in small but beautiful and well developed crystals, some of which have been found in Alexander County, at the Deake Mine, Mitchell County; and in the Cowee Valley, Macon County.

GEM MINERALS.

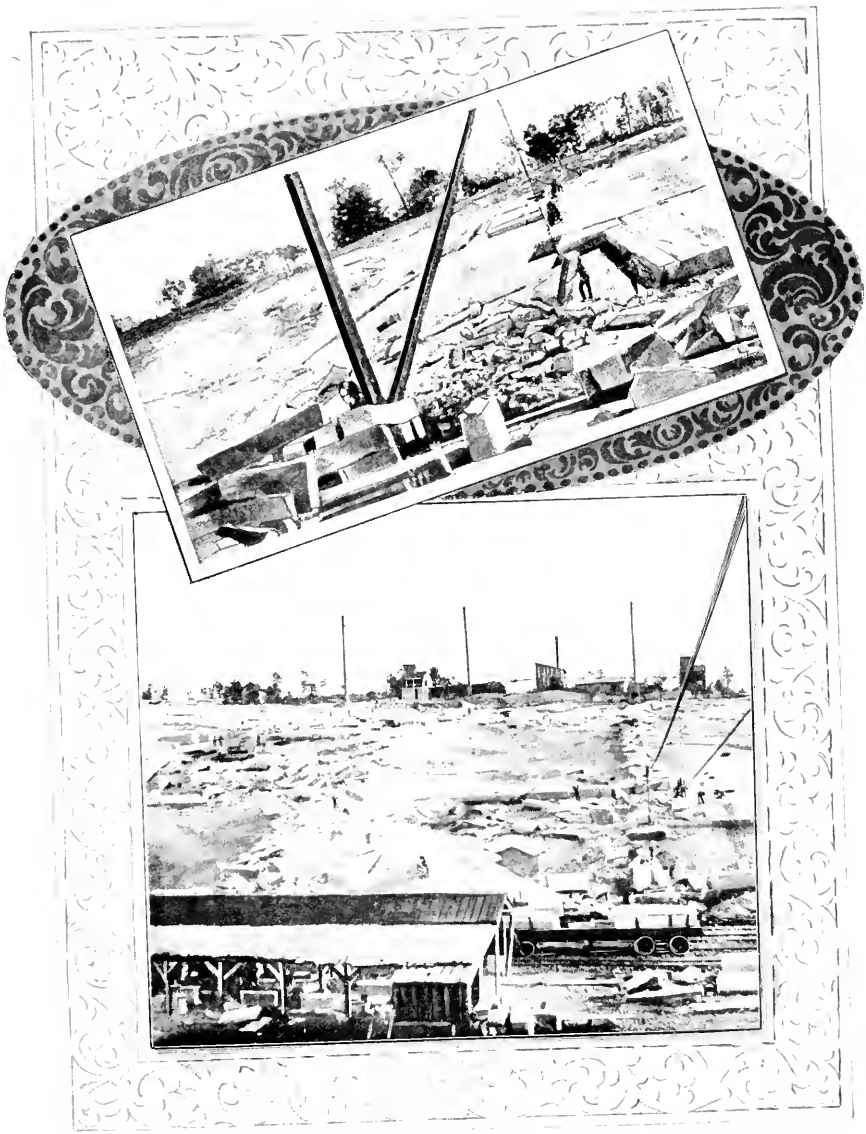
There are many of the gem minerals that have been found in North Carolina, and deposits of some have been found in sufficient quantity to become regular producers. There has been but little systematic search for these minerals, but accidental discoveries have been made in various places, that have in some cases led to the opening of good deposits of gem material. There have been a number of companies organized who are mining in the State exclusively for gems. The principal gem localities are in Macon, Yancey, Mitchell, McDowell, Burke, Alexander and Iredell Counties.

DIAMOND.

In North Carolina diamonds have been repeatedly found; and there are now ten authentic ones whose occurrences are fully established. Besides these three others have been reported. They have been



STONE MOUNTAIN—WILKES COUNTY.



MT. AIRY GRANITE QUARRY—CAPE FEAR & YADKIN VALLEY RAILROAD.

distributed over a wide area in the counties of McDowell, Burke, Rutherford, Lincoln, Mecklenburg and Franklin. With the exception of Franklin all of these counties are in the eastern drainage basin of the Blue Ridge. Two have been on Brindletown Creek, Burke County; one at the Twitty mine in Rutherford County; one near Cottage Home, in Lincoln County; two on Tod Branch, Mecklenburg County; three from Muddy Creek, McDowell County; and one from the Portis mine, Franklin County. Besides these, one is reported from Richmond County, and another from Rutherford County. The largest diamond weighing 4 1-3 carats, was found in 1886 on the farm of Albert Bright in Dysartville.

CORUNDUM GEMS, RUBY AND SAPPHIRE.

There is no State or country that excels North Carolina in its variety of corundum gems. It is found red, ruby-red, sapphire-blue, dark blue, various shades of green, violet and purplish, rose, pink, brown, yellow, gray and colorless. The corundum gems are determined by the color and there are at the present time nine varieties that are commonly recognized by the lapidaries. In the arts these are usually prefixed by the word "oriental" to distinguish them from other gems of the same name, but whose mineral composition and character are entirely different. These varieties are as follows:

Oriental or true Ruby—Red of various shades.
Oriental Sapphire—Blue of various shades.
Pink Sapphire—Rose or Pink.
White Sapphire, Diamond Spar—Colorless.
Opaline, Girasol, Hyaline—Pale blue or bluish white.
Oriental Amethyst—Purple.
Oriental Emerald—Green.
Oriental Topaz—Yellow.
Star Sapphire, Chattayant, Asteria—Opalescent.

The locality that has furnished the greatest variety of these gems is the Corundum Hill mine, at Cullasaja, Macon County. Sapphires have also been found at the Grimshaw mine, Montvale, Transylvania County, and at Sapphire, Jackson County.

The North Carolina locality for corundum gems which is attracting considerable attention at the present time is a tract of land in Macon County, between the Caler fork of the Cowee Creek and Mason Branch, two tributaries of the Little Tennessee River.

Ruby corundum of exquisite color and transparency has been found in the gravel deposits of the Caler fork of Cowee Creek. Although but a very small percentage of the corundum found in the gravel was transparent, nearly all was of the ruby color. Beautiful rubies of a rich pigeon blood red color have been found here, that could not be told from the Burmah stones. The best stone that has thus far been found is valued at $1,500. Many smaller gems have been obtained that were perfectly transparent and of good color.

RHODOLITE.

Associated with these rubies is the gem Rhodolite, one of the garnet group. It has a variety of shades of color, which for the most

part are similar to the delicate rose-like tinge of the rhododendron. Then again its remarkable brilliancy vies with that of the diamond. Most of the varieties of garnet are only beautiful by transmitted light and otherwise exhibit dark shades of color, but rhodolite gives most striking effects of beautiful and varied coloring by reflected light. When first discovered the rhodolite was mistaken by many jewelers as a variety of ruby, and not until they had tested it would they believe otherwise. The rhodolite has only been found in North Carolina, and in a very limited area, which includes the gravels of the streams that rise on Mason Mountain, Macon County.

GARNET GEMS.

Besides the rhodolite referred to above, the almandite and pyrope varieties of garnet have been found extensively in many sections of the State. Good gems of these varieties have been found in Macon, Alexander, Yancey, Mitchell, McDowell, Burke, Caldwell, Catawba and Lincoln Counties, but the best colored gems have been obtained from the first two counties. At many of the mica mines, transparent garnet crystals are found flattened out between the foliæ of the mica. Besides as gems, garnet is widely distributed in the State, and is a constant constituent of many of the micaceous and other igneous rocks, and as has been stated above occurs at times in sufficient quantity to be of value for abrasive purposes.

BERYL.

This is a mineral that varies in color from emerald green, pale green and sea green to yellow, light blue and white. The emerald green is due to the presence of a little chromium and is a variety that is highly prized as a gem when clear and free from flaws. The beryl emerald is the emerald that is commonly sold at the present time, the oriental or true emerald (the green variety of sapphire) being one of the rarest of the gem stones. North Carolina has furnished some very handsome beryls of emerald green color some of which have been cut into fine stones. The most noted locality is near Hiddenite, Alexander County, North Carolina. The first emeralds that were obtained in this locality were found in the soil and it was not until 1881 when the Emerald and Hiddenite Mining Company was organized that any direct mining was undertaken. As the deposits were followed downward through the soil the unaltered rock was encountered and as the work was extended into this their exact occurrence was seen. They occur in pockets of quartz associated with rutile, hiddenite, quartz, muscovite, dolomite, pyrite, garnets, etc., all of which are well crystalized. The rutile found here is the finest that has been observed in any locality in the world. It is a mineral of a nearly black color by reflected light but a deep red in thin splinters by transmitted light and is often used for cutting into stones for seal rings as a substitute for the black diamond which it somewhat resembles when cut. The quartz associated with the emeralds is exceptionally well crystallized and has furnished some of the most modified crystals ever found.

The largest emerald crystal found here was a very perfect specimen of a fine but somewhat light green color, which was doubly terminated and weighed 8¾ ounces. One of the largest stones cut weighed 4 23-32 carats and was of a somewhat light green color.

On Crabtree Mountain between Brush and Crabtree Creeks, Mitchell County, emerald beryl occurs in a pegmatitic vein. No very large crystals have as yet been found at this locality, but some have been taken out that have cut small gems of a deep emerald color. Matrix specimens of emerald with feldspar, tourmaline or quartz are being cut which make handsome stones.

The aquamarine variety of beryl is found very commonly in many of the pegmatitic dikes that have been worked for mica. The most important of these are in the vicinity of Spruce Pine, Mitchell County, at the Ray Mine, Yancey County, and the Littlefield Mine, Macon County, where transparent aquamarine beryls have been found very abundantly that have cut many beautiful gems. Besides the aquamarine, blue beryl has been found in fine crystals in the mines near Spruce Pine, of Mitchell County, as has also the yellow or golden beryl. The Wiserman property near Spruce Pine, Mitchell County, is a promising field for aquamarine and has furnished pieces up to 20 carats in weight.

HIDDENITE.

This gem is a variety of mineral spodumene, a lithium aluminum silicate, and is of a deep green color due probably to the presence of minute quantities of chromium. Hiddenite has only been found at the emerald locality at Hiddenite, Alexander County. While some of the crystals have a uniform green color they are generally yellow at one end and graduate through yellowish green to a green at the other. The hardness of the hiddenite is below that of quartz, being but 6.5 to 7, but on account of its rarity, color, and very brilliant lustre it ranks at the present time as one of the most expensive gems. The finest crystal that was obtained from this locality measured 2 3-5 inches by ½ inch by ¾ inch with one end of a very fine green color and would probably afford a gem, if cut, which would weigh about 5½ carats.

QUARTZ.

This mineral is very varied in its occurrence and is found in many colors and forms, furnishing many varieties of gems. The more important of these gem varieties are given below:

Rock crystal has been found in many beautiful transparent crystals and masses from White Plain, Surry County, Hiddenite, Alexander County, and Chestnut Hill, Ashe County.

Smoky quartz or Cairngorm stone is found in quantity in Burke and Alexander Counties.

Amethysts of a beautiful deep purple color have been found at a number of localities in the State, principally in Macon, Lincoln and Catawba Counties.

Sagenite or Venus Hairstone is crystal quartz that is penetrated with

a net work of acicular crystals of rutile. Some of the most beautiful specimens of this rutilated quartz have been found in Alexander and Iredell Counties. It has also been found in Catawba, Burke and Randolph Counties.

Citrine or Spanish topaz is a yellow variety of quartz that has been found in Burke and adjoining counties, but seldom of a rich deep color.

Other quartz gems that have been found in North Carolina are chrysoprase, from Macon County, rose quartz, morion, from Alexander County, aventurine, from Iredell County, chalcedony, agate, jasper and carnelian.

OTHER GEM MINERALS.

The feldspar that is a component part of the pegmatitic dikes of Mitchell and Yancey Counties is occasionally met with that is of good quality for cutting into moonstones and sunstones.

Beautiful crystals of rutile are obtained from Alexander County that have been cut into gems that resemble black diamonds.

Fine blue crystals of cyanite are obtained in Mitchell and Gaston Counties, and near Spruce Pine, Mitchell County, some of the finest grass green cyanite, that are known, have been discovered.

Staurolite, zircon, spinel, peridot, lazulite, serpentine, malachite and tourmaline are among the other gem minerals that have been occasionally obtained in the State.

KAOLIN.

Kaolin has been found in a number of widely separated localities in North Carolina, especially in the mountain region, in the form of extensive veins or dikes which were formerly composed largely of feldspar, but which have decayed from the action of atmospheric agencies and formed the mineral kaolin. Associated with the kaolin there is always some quartz and mica which were original constituents of the dike or vein. The best kaolin deposits are those in which the feldspar formerly largely predominated in the dike. These dikes vary considerably in size, ranging from a few inches to several hundred feet in thickness and up to several hundred yards in length. They are usually parallel to the schistosity of the crystalline rocks. At the present time kaolin is being mined at a number of places in the vicinity of Webster, Sylva and Addie, Jackson County, and in the vicinity of Bryson City, Swain County. A deposit has also recently been opened up near Bosticks Mills, Richmond County. The kaolin deposit that has been worked the most extensively is the one near Webster and known as the Harris Mine. This has been worked to a depth of 120 feet below which point the material becomes harder and does not permit of cheap mining operations. The dike in which this mine occurs has a thickness of nearly 200 feet and has been traced across the country for a distance of more than half a mile. Similar, but smaller, kaolin dikes are common throughout the mountain and Piedmont Plateau regions, but in order to be successfully worked they must be near railroad facilities.

OTHER CLAYS.

There are many deposits of clay varying in shades of color from white looking kaolin to purplish and yellowish brown which have resulted from the decay of granite and other feldspathic rocks in the regions where they are found. These clays vary in composition both with the character of the rocks in which they have been found and with the extent to which the materials and the original rocks have been separated by the sorting action of water in transporting materials from one place to another. They are usually a reddish or yellowish color owing to the presence of iron oxide, and as this oxide becomes less the clays become lighter in color and those that are practically free from iron oxide are white. There are but few regions throughout the State but that contain more or less clay suitable for the manufacture of brick needed for the construction of houses or chimneys. There are also a number of deposits that are capable of being utilized for the manufacture of fire brick such as the clay beds at Pomona, Guilford County, near Grover, Gaston County, and near Emma, Buncombe County.

With the very extensive deposits of good clay that are known to exist in the State, there is a splendid opportunity for the investment of capital for the manufacture of fire brick, fancy and pressed brick, and of tile, drain and sewer pipes.

GRAPHITE.

Graphite is found in small quantities widely distributed in North Carolina in crystalline slates and gneisses. There are a number of localities where a graphitic schist is found which contains portions that are of a more or less impure slaty and earthy variety.

The most extensive as well as perhaps the best known graphite deposits in the State are in Wake County, extending in a northeast and southwest direction for a distance of 16 or 18 miles and passing 2½ miles west of Raleigh. These have been worked to a limited extent for a number of years and offer very promising results for investment.

Similar deposits of graphite are found in McDowell County which can be traced for a distance of about 3 to 4 miles in a northeast–southwest direction from Brush Mountain on the west to Fork Mountain on the east.

Another promising deposit of a very pure crystalline graphite occurs in Wilkes County about 12 miles from North Wilkesboro, which is now being developed.

COAL.

The coal deposits of North Carolina are confined to the areas or belts of Triasic sandstone. The larger of these is known as the Deep River belt which in a general way extends along a trough from Oxford in Granville County, southwestward across the State with a width near its central point of some 15 miles, but narrowing very considerably at each end. The coal of the Deep River belt is limited to a region extending from the southern part of Chatham County 10 or 12 miles into the northern part of Moore County. There are five seams

of coal reported in this belt which are separated by black shales and slates, black-band iron ore and fire-clay. These seams of coal vary from 6 inches to 4 feet in thickness, but with a probable workable average of 22 to 24 inches. While this cannot be called an extensive coal field, it does offer possibilities of remunerative coal mining. The principal mines being operated are the Cumnock, by the Chatham Coal and Coke Co., located at Cumnock, Chatham County. Other properties that are at the present time being prospected and developed are in the vicinity of Eaglesprings, Moore County.

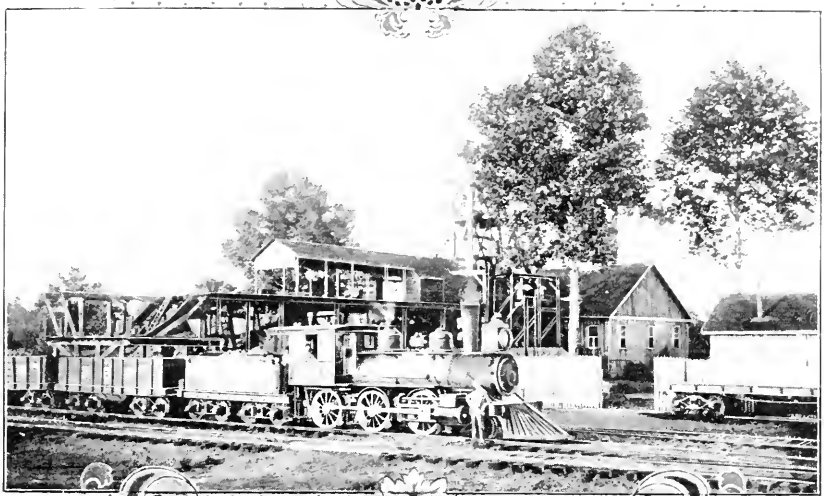
The Dan River belt, which has a width of from 2 to 4 miles, and a length of nearly 30 miles in a northwest–southeast direction, does not offer as promising possibilities for coal mining as the Deep River belt. The most promising outcrops for coal are those along the line near the wagon road from Walnut Cove to Germanton. The coal bearing seam at this point is said to have a thickness of from 2 to 7 feet.

BUILDING STONES.

North Carolina is exceptionally well provided with building stones which are to be found in abundance in the middle and western counties.

Sandstones are found in the Triasic sandstone formation that forms one belt of rock in Anson, Moore, Chatham, Wake, Durham and Orange Counties, and another in Stokes and Rockingham. The principal points at which brown stone or sandstone is being quarried are Sanford and Carthage. in Moore County; Cumnock, Chatham County; and near Durham, Durham County. In the western part of Wake County there is good desirable sandstone that is accessible to the railroad. In Anson, in the vicinity of Wadesboro, there are a number of good deposits of sandstones, as at the Frank Hammond, Linehan and Wadesboro quarries. Moore County has a number of localities where a good quality of sandstone can be obtained, one is about one mile northwest and another (the Rockle and Lawrence quarry) one mile southwest of Sanford. The sandstone deposits of Chatham County are in the vicinity of Gulf and Cumnock (Egypt) and there are a number of localities that offer favorable opportunities for quarrying. The sandstone deposits of Durham County are a few miles north and east of the City of Durham. There are also good deposits in the vicinity of Brassfield in the southwestern corner of the county.

Concerning the granites, only a brief notice can be given to the more important quarries and places. Near the City of Raleigh, Wake County, there are a number of quarries that have furnished a hard, tough, fine grained gray gneiss. At Wyatt a pink granite is found, and near Rolesville a gray granite occurs abundantly, Twelve miles west of Springhope, Nash County, there are extensive beds of gray biotite granite of medium grain. In the vicinity of Oxford, Granville County, and Warren Plains, Warren County, a fine light gray granite is to be found that works well. At Greystone, Vance County, a fine grained gray granite is being quarried. A very pretty mottled porphyritic granite occurs near Lilesville, Anson County. A few miles



CUMNOCK COAL MINES.

south of Wilson, Wilson County, there are considerable beds of coarse, red, feldspathic granite, which takes a good polish, closely resembling red Scotch granite.

Building stones are abundant in the higher portions of the Piedmont Plateau region. The more important quarries are in the vicinity of Dunn Mountain, Rowan County, and 4 to 5 miles east of Salisbury, at Concord, Cabarrus County, Mooresville, Iredell County, and Mt. Airy, Surry County.

The Dunn Mountain region is an exceedingly valuable and extensive granite area and is now being very extensively worked by a number of companies. The Mt. Airy quarries are perhaps the best known of any quarries in the State and have been the most extensively worked. The stone is a nearly white granite of uniform grain and texture. In Davie County there is a very unique but beautiful stone, called "obicular granite" that is found at Coolomee.

In the mountain region the principal quarrying is done at Balfour, Henderson County.

Marble occurs very extensively in Swain and Cherokee Counties and is being quarried at Kinsey in the latter county. Very promising deposits are at Hewitts and Nantahala, Swain County, and near Andrews, Cherokee County. The former of these is well located for quarrying.

Slate of good quality is found in the vicinity of Egypt, Pittsboro, Goldston, Chatham County, and near Albemarle, Stanley County.

There are many good stone deposits awaiting development that will make good profitable propositions.

THE WATER-POWER OF NORTH CAROLINA.

Its Value as a Source of Power and as a Factor in the Prosperity of the State.

IN any presentation of the State of North Carolina as a field of profitable investment, or in the enumeration of its natural resources and in the consideration of the wealth and prosperity into which these are capable of being transformed by a passage through the mill and the workshop, the water-powers of the State should receive the attention which they so richly merit from their number and magnitude. As a source of present wealth and as a guarantee of the future prosperity which will follow their more general recognition and use, as the State advances in the knowledge that its great future lies rather in the production of the finished articles of commerce than in the raw materials of which these are composed, the water-powers may be considered as first in importance among its resources.

Nature has lavishly bestowed mineral and timber wealth, and a generous and fertile soil, but these things have been granted with a lavish hand to other favored regions, while North Carolina stands alone among the States of the South in the number and

extent of the valuable water-powers to be found within its borders, and with the exception of Maine, stands possibly foremost among the States bordering on the Atlantic Ocean and on the Gulf of Mexico, when all affecting conditions are considered, such as fall, volume of flow, ease and cheapness of development, proximity to the raw materials, and the presence of localities where an ample supply of cheap power is one of the greatest present needs, and which alone operates as a deterrent to the establishment of many small industries, which once begun would speedily grow to greater ones, each such increase being reflected in an added prosperity in the community.

That North Carolina should stand out pre-eminent in this respect ceases to be a matter of surprise when its geographic location, its climate and its topographic features are brought into consideration, it is rather a matter of wonder that the State has so long escaped the recognition in this respect which is its just due. That in the past it has escaped such is due to the habits and characteristics of its people, who have devoted themselves to the pursuits of agriculture rather than to those of manufacture, contenting themselves with exporting the raw materials and with the proceeds purchasing such articles as were necessary for their well-being and comfort, even though the cataract has been thundering down at their very doors, dissipating in foam the power of a thousand horses and clamoring to be harnessed and put to use in the service of mankind. For an agricultural population, large towns are not a possibility, and in the absence of such there is no market for power in quantity, and lacking the examples in the way of small manufacturing operations so furnished, the possibility of such small beginnings has not been conceived until the last few years.

Before proceeding further in this connection it will be well to consider those features of climate and surface development which have tended to produce the multitude of water-powers which are to be found on almost all of the rivers of North Carolina. In the production of a water-power two things are necessary, viz: a certain volume of water flowing regularly in a stream, and a fall, either natural or artificial, over which this water passes, and by its weight, may be made to drive machinery suitably arranged for the purpose.

It is an obvious fact that all the water flowing at any time in any stream must have been derived from the rainfall somewhere within the drainage basin of the stream, and this rain need not of necessity have fallen during the last few days or weeks, but may have fallen months before, percolated into the soil, sunk to an impervious stratum and flowed along this for many miles, finally reaching the stream, to be carried by it to the ocean and there re-evaporated by solar action to go the same round again. The amount of the annual rainfall on the basin of any stream is therefore an important factor in the value of the stream for power purposes, as is also the character of the soils of the area drained by it. Where the soil is deep and pervious, permitting the absorption of a large proportion of the rain which falls on it, holding it back from the stream in time of floods and giving it out slowly in time of drought, then such a stream will have a more constant and uniform flow than would be the case if the character of the

WATER POWER, TAR RIVER—ROCKY MOUNT.

soils were such as to shed with rapidity the greater part of the water falling thereon into the streams draining the area. Where the drainage basin of a river is of this class the stream is flashy in nature, subject to violent floods and periods of very low flow, and its value as a source of water-power is greatly diminished.

The distribution of the rainfall throughout the months and seasons is also of great importance, as may be easily seen from the following considerations. None of the water which falls in the form of rain on the basin of any stream is lost, although no stream carries back to the sea an amount of water equal to that which has fallen as rain on its basin, for the plant life requires a great part, the sun evaporates another large portion from the soil and from the surface of the stream, another smaller portion goes to fill the deep-seated reservoirs of the soil, if such have been emptied by previous drought, and it is only after all these needs have been supplied that the surplus water flows into the stream.

The demands of plant life and of evaporation are greatest in amount at the same period of the year, that is, when the sun is the hottest and vegetation makes its greatest growth, and if this time of greatest demand for water is the time when the supply is a maximum, then the stream will be able to carry a greater volume of water than would find its way into it if the conditions were reversed and the time of least rainfall came at a time when the demands of plant life and of evaporation were the greatest.

For purposes of description of the climate and topography of North Carolina, the State may be conveniently divided into three sections or regions, each differentiated from the other by certain well-marked peculiarities. These regions are known as the Coastal Plain, the Piedmont Plateau and the Appalachian Mountain Region, and from the great extent of the State and the consequent great variation in climate and physical features it will be necessary to enter on a brief description of each of these regions.

THE COASTAL PLAIN REGION.

This region has been built up in comparatively recent geologic time of unconsolidated sands, clays, gravels, etc., resting on the west on the sloping, rocky surface of the hill country—the eastern margin of the Piedmont Plateau. This contact between the two regions is one of the most clearly defined of natural boundaries, and is known geographically and industrially as the "fall-line," along which is located, at the head of navigation on the more important streams, a number of manufacturing cities and towns, such as Richmond, Petersburg, Weldon, Columbia, Augusta and others.

On the seaward side of this fall-line, or fall-line zone as it might more properly be designated, are found the sluggish navigable rivers which make their way southeasterly across the coastal plain region in tortuous and unstable channels. From its formation this area is unfavorable to the development of water-power over the greater part of its area, and in fact none worthy of the name is found within its borders, with the single exception of that to be found on the streams

of what may be called the "sand hill country," which is found along the western edge of the coastal plain, where the hills and ridges are more numerous and irregular and rise to elevations of from 300 to 500 feet above sea level. In this region the streams are of small size, but on some of them powers out of all proportion to the drainage area have been developed and the power used in the operation of a considerable number of cotton mills. All such powers, however, are now in use and we may therefore pass over this region without further consideration.

THE PIEDMONT PLATEAU REGION.

This region lays between the coastal plain and the mountains from New Jersey to Alabama, and exhibits a great diversity of characteristics, though there are many features common to the region. Along the eastern margin the hills are no steeper and rise no higher than those of the adjacent coastal plain, and this is especially true as where in the southern half of North Carolina this plateau includes on the east a narrow belt of red sandstone which has been in places more rapidly eroded by atmospheric agencies than have the sand hills to the east of the fall-line. As a rule, however, the hard crystalline rocks and red soil of the Piedmont Plateau are to be found at the fall-line, and exhibit there the undulating surface characteristic of the red hill country, the surface elevation near the margin ranging from 300 to 600 feet. The eastern half of the region, taken as a whole, has an average elevation of about 750 feet, while the western half will average about 1,200 feet.

Toward the western margin the hills rise higher until they may be fairly considered as mountains. The soils, which for the most part have been formed by the decomposition of rock in place, are generally gravelly, sandy and deep in the granitic areas, and more clayey and shallow in the slate belts.

The average southeasterly slope of this region is about three and a half feet to the mile, but the possibility of developing water-power on the several streams depends less on this average slope than upon the concentration of the fall in certain places, where for distances of a few yards or at most a few miles the streams assume the form of shoals, rapids and cascades. The several geologic formations which go to make up this plateau cross the State obliquely, parallel to the mountains and the seashore, and in the main they form a succession of belts of granites, slates and gneisses, turned sharply on edge and across which the streams have carved their channels in making their way to the sea. The fact that these rocks differ greatly in character, and are eroded with varying rapidity by the action of the water in the stream, gives rise to the conditions which are productive of rapids and shoals, and in this way the development of many water-powers is made possible.

THE APPALACHIAN MOUNTAIN REGION.

This region may be said to have its culmination in North Carolina, since here it reaches its point of maximum development. This region embraces an irregular and very mountainous tableland, lying between

the steep and well defined escarpment of the Blue Ridge on the east and southeast, and the less regular, but in places equally prominent, northwestern slope of the Great Smoky Mountains. Numerous cross chains connect these two ranges, and the region taken as a whole has an average elevation of about 2,700 feet, but there are many peaks which rise above 5,000 feet and a considerable number which are over 6,000 feet high, while Mt. Mitchell, the highest of the Black Mountains, and the highest mountain to the east of the Rockies has an elevation of 6,711 feet.

The mountain slopes, though usually steep, are forest covered and have a deep and fertile soil, of varying physical character, but as a rule very porous and capable of storing up large quantities of water and feeding it out to the rivers and smaller streams in time of drought. This character of soil and forest covering has such an effect on the flow of the rivers draining this area that even in times of the most excessive drought they carry a volume of water greater than will be found in streams draining an area many times as large, but located out of the mountains.

In the consideration of the climate of any region with reference to its effect on the water-power of the region only the amount and the seasonal distribution of the rainfall possess a great deal of interest, except in so far as the temperature affects this, by the formation of ice in excessive quantities. In a country located as in North Carolina this may be dismissed with the brief statement that this has no effect whatever, for nowhere in the State does ice form in quantity sufficient to cause a cessation of operations for more than a day or two, even in the coldest weather, and many winters pass without this trouble being encountered.

As before stated, on account of the topography of the Coastal Plain region the streams flowing through that area have no value for water-power purposes, and consequently the climate there will not be discussed. Taken as a whole North Carolina belongs to that region of the United States characterized by the largest precipitation, the center of which lies on the Gulf Coast about the mouth of the Mississippi River, but there are areas on the southeastern slopes of the Blue Ridge within the borders of the State which receive an annual rainfall not exceeded anywhere except on the coast of Washington and Oregon. The annual averages for two stations located in the area characterized by this excessive precipitation are 72 and 73 inches respectively. This amount is very much greater than is to be expected over the mountain region, taken as a whole, the average for this section being about 53 inches per annum, that for the Piedmont Plateau region being even less, averaging 48 inches.

These amounts are greater than the average rainfall experienced on the basins of the streams of the New England States, where the power is so much used, and which have been such a source of prosperity to that region, and as a rule the run off per square mile in time of drought is greater for these streams than for those of New England, even though those experience the regulating effects of the lakes which are to be found in that region, and where moreover the soil is largely a glacial drift, which is capable of storing up large quantities of water.

This large dry weather flow, however, is not characteristic of all the streams of North Carolina, and is not found on the Tar, Neuse and Cape Fear Rivers, and the same is true to a less extent of the Roanoke River. On all the other streams of the State the flow in drought is very large.

This is in a very great measure accounted for by the favorable distribution of the rainfall throughout the year, the time of maximum rainfall occurring in July and August, when the evaporation is the greatest and when the demands of vegetation are also very great, while the chief minimum amount of precipitation is observed in October, when evaporation is lessened and plants have about ceased growth. The August average is 134 per cent. of the monthly average, while the October average is 77 per cent.

There is one other feature which must be considered when discussing the rainfall of a region in its effect on the water-power to be found there, and that is the occurrence of excessive freshets in the rivers, and their duration. It may be said that about once in half a century the rivers of North Carolina, in common with those of the whole United States, are visited by freshets of great magnitude, which work much destruction to the farming lands along the banks, but which in this State have but small effect on any construction across or near the stream. So far as the writer is aware there is no record of a well built dam ever being destroyed by high water on any of the rivers of North Carolina, and there has been only one flood which has done any damage to mill buildings by flooding. There are, however, two flood periods for the rivers of the State, in the spring and again in July and August, but owing to the slope of the channels these floods are very short in duration, a stream often rising and falling in twenty-four hours, while no flood lasts more than from two to three days. The loss of time from this cause is therefore quite small.

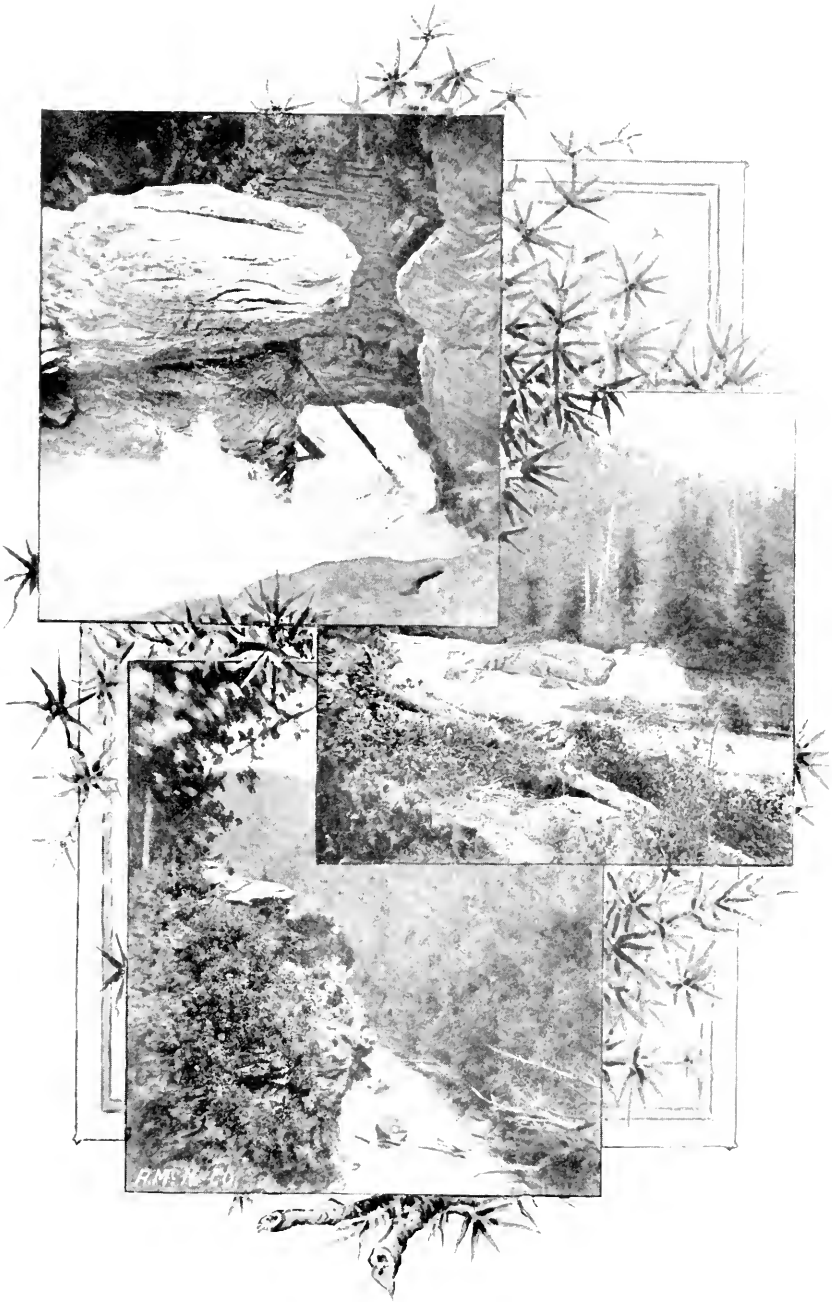
In a short paper such as this it is impossible to even name the greater part of the water-powers to be found in the State. For this purpose a volume would be necessary, and those desiring to pursue the subject at length are referred to a report on this subject recently issued by the North Carolina Geological Survey, as Bulletin 8 of the survey series of publications, in which will be found at some length and with as much detail as possible descriptions of a great number of the water-powers of North Carolina.

POWER POSSIBILITIES.

In this paper only the largest of these will be touched on, and no attempt will be made to express the size in figures, though the power available will range from one to many thousand horse-powers.

The rivers of the State will be taken in geographical order, from north to south, and the power possibilities of each briefly described.

On the Roanoke River the first power met with is found at and near Weldon, where the river crosses the fall-line. Here the fall is about 85 feet in a distance of about 9 miles above Weldon, and as the volume of water carried by the stream is large at all times, the drainage area above this place being more than 8,000 square miles, a large amount of power can be made available. Two companies have



ON LINVILLE RIVER.

interested themselves in the development of this power, much work has been done and the development completed, though the full capacity of the power has not been reached as yet. The power is sold to a number of mills at very reasonable rates, the mills being built either along the canals and using the water direct or electric power is furnished where desired. It is calculated by the engineers in charge of the development work that more than 18,000 horse-power can be secured here.

Above this point the fall of the river is considerable, but there are no other powers at all comparable to this one, though there are several localities where power sufficient for the needs of a single large mill can be obtained.

The Roanoke River is formed at Clarkesville, Virginia, by the injunction of the Dan and Staunton Rivers, the course of the Staunton lying wholly in Virginia, while the Dan is in North Carolina for the greater part of its length above the City of Danville, and there are in this part of its course a large number of localities where powers less than 500 horse-powers could be easily and cheaply developed and on several of the tributaries of the Dan in this part of its course powers have been developed which are now furnishing power for a number of large cotton mills, notably those at Spray and Mayodan.

The water-power on the Tar River is of small importance, with the single exception of that at Rocky Mount, where the river crosses the fall-line, and this power is used to its full capacity by the Rocky Mount Cotton Mill.

The Neuse River is of somewhat more importance as a power stream as there are a number of sites where power in some quantity may be secured, the most notable of these being located at Milburnie and at the Falls of Neuse, both of which have been recently developed to their full capacity.

Passing to the southward, the Cape Fear River is the next stream and there are found along its length a number of powers of more importance than any yet mentioned, with the exception of that found on the Roanoke River at and near Weldon. The first power met with on this stream as it is ascended is that known as Smiley's Falls, where the river crosses the fall-line in a shoal about three and a half miles in length, and with a total fall of about 27 feet, furnishing one of the largest powers in that section of the State. This site is now being developed, and it is proposed to transmit the power electrically to the town of Fayettteville for manufacturing and other purposes. Buckhorn Falls is the most important power on the river above Smiley's Falls, the available fall here being about 20 feet. It seems probable that this power will be developed at an early date as the preliminary surveys have already been made.

The Cape Fear River is formed a short distance below the village of Moncure by the junction of the Haw and Deep Rivers, both of these being manufacturing streams of great importance, and on which the power available is already very largely in use, though the largest powers on both streams are as yet awaiting development.

On the Deep River the first power met with above the junction with the Haw is found at Lockville, where there is a total fall of

about 27 feet, and where a large amount of power can be secured. The development of this power is projected in conjunction with that of Buckhorn Falls, noted above. Above this site there are a large number of powers, many of them of magnitude sufficient to supply a single mill, and cotton mills are now located on many of these, eleven being situated on its banks, besides a number of grist mills and saw mills.

Haw River is also a stream of considerable importance, having along its course a number of important water-powers, some of which are as yet undeveloped. The best known of these latter is probably that known as the Moore mill-site, where the fall is 22 feet and the amount of power quite large. Henley's mill-site is also an important site, the available fall being about 16 feet, and there are a number of powers above these, but of less importance. There are ten cotton mills located on this stream and on its tributaries.

Passing now to the west we come to the Yadkin River, this stream and the Catawba being the principal power streams of the State, on account of their size and large fall. On the Yadkin the fall is great and much concentrated, so that the powers are large and numerous, and only those of greatest importance can therefore be noted. The first power on the stream in North Carolina, as it is ascended, is that known as the Grassy Island shoal, located about 13 miles above the South Carolina line. Here there is an available fall of 35 or 36 feet in a distance of about four and a half miles, and the power available is more than 7,500 horse-powers. Surveys have recently been made of this power, and it seems probable that it will be developed shortly.

Probably the most famous water-power to be found in the Southern States is that known as the "Narrows of the Yadkin." At this place the river contracts from a width of more than a thousand feet to an average width of not more than one hundred and fifty feet, while in places the width is not more than sixty feet. From the banks, which are from ten to fifteen feet in height and almost perpendicular there extends back on both sides of the river a flood plain about one hundred and fifty yards wide, from which the river hills rise very steeply. In the gorge thus formed, which is about one mile long there is a fall of about 37 feet, and from the head of the narrows to the mouth of the Uharie River, a distance of about four miles, the total fall is 91 feet.

Immediately above the head of the Narrows there is a series of rapids containing an aggregate fall of 110 feet in eight miles.

For many years it was considered that the great cost of development rendered this part of the river valueless for power purposes, bnt recently the development has been begun, and it is stated that a total of more than 30,000 horse-power will be developed, making this water-power second only to that at Niagara.

A short distance above the head of the rapids noted above are found two very good water-powers, the fall in each case being about fourteen feet, and in addition to these there are a number of places where power

in quantity can be secured but space forbids the mention of all but two. A fall of ten feet has been developed by the Fries Manufacturing and Power Company, and 1,000 horse-power is transmitted electrically to Winston-Salem and there used for manufacturing and other purposes. Bean Shoal is the principal power on the upper part of the river, having a fall of 39 feet in about four miles, so located that an easy and safe development could be secured.

In addition to the enormous amounts of power which are to be found on the main river, briefly sketched above, there are large amounts used and still available on some of the tributaries, notably on those classed as sand hill streams. One of these, Hitchcock's Creek, which is only from 16 to 20 miles long from source to mouth and drains about 102 square miles, furnished power snfficient for the operation of six large cotton mills. The south Yadkin is the most important of the tributaries, having several important power sites located on it, of which the most noted is that at Cooleemee, where a large cotton mill has recently been constructed.

There are many large powers on the Catawba River in North Carolina, of which the first is known as the Tuckaseegee Shoal, partly developed. The next and probably the most important on the river within North Carolina, is the power at the Mountain Island Shoal where the fall available is 38 feet, and where a large amount of power can be obtained. This shoal is also partially developed, and the power used by one cotton mill. It has been reported recently that this power would be developed to its full capacity and the power transmitted electrically to Charlotte. Above this locality are the Cowan-Ford Shoal, Beattie-Ford Shoal, Monbo Shoal, Long Island Shoal and Buffalo Shoal, all good water-powers.

Lookout Shoal has the greatest fall of any on the river in North Carolina, the fall from head to foot being over 54 feet, and a large amount of power can be easily developed. It is reported that this development is to be made in the near future and the power utilized for a large cotton mill. Above this are found the Lower Little River Shoal, Canoe Landing Shoal, Great Falls and Horse Ford Shoals, which are all very good locations and worthy of investigation by those seeking water-power, and above these there are others where smaller amounts of power can be easily and cheaply obtained.

The south fork of the Catawba River is one of the principal manufacturing streams of the State, almost all of the power being in use. There are eight cotton mills deriving power from this stream, and numbers of others nearby.

It may be said in reference to the water-powers on the Yadkin and Catawba Rivers that the facilities for transportation are quite good, as none of them are more than a few miles from a railroad.

There are a number of water-powers found on the Broad River and its tributaries, these being for the most part undeveloped, such as the Hopper and Blanton Shoal, the Palmer Shoal, Durham Shoal and Big Island Ford Shoal. The power on the tributaries has been much more largely developed than has that of the main stream. Thus on the First Broad River and its tributaries there are four cotton mills and several saw mills and grist mills operated by water-power.

On the Second Broad River are located the Henrietta Mills, Nos. 1 and 2, containing a total of 60,000 spindles and 2,000 looms, all operated by the water of the stream. The power on the other tributaries with the exception of that on Green River is not worthy of mention.

No very thorough examination of the streams to the west of the Blue Ridge has ever been made though it is known that the conditions are favorable for the development of large amounts of power on all of these streams at a number of places. The fall per mile of all these streams is great, the dry weather flow large and constant, and the conditions for building dams, etc., are uniformly favorable.

However these streams are subject to floods and to periods of comparatively low flow, though even in the most extreme drought the flow per square mile is great, but the drainage areas are small.

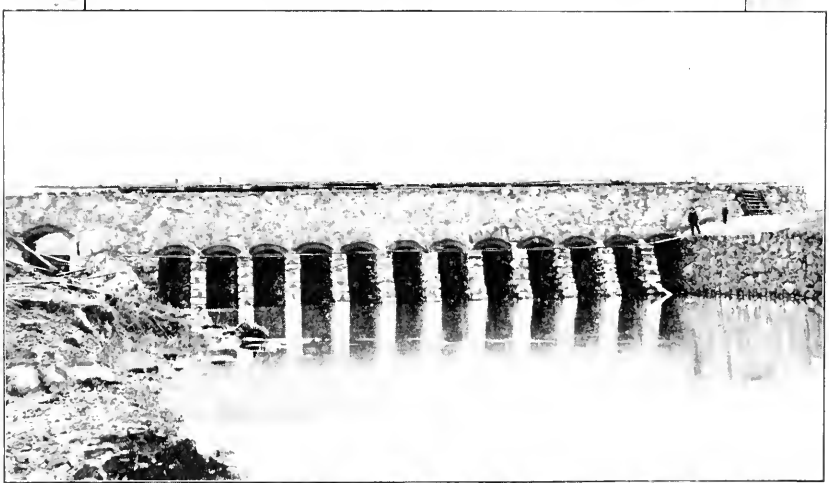
The greater number of localities in this region which are considered favorable for water-power development are unfortunately located many miles from a railroad, and there is no such thing in the region as a good wagon road, while in many cases the river gorges are so narrow and the surrounding country so rough that the conditions are not favorable for the establishment of adjacent manufacturing plants. Hence in the development and utilization of these powers it would seem not only advisible but necessary that the power should be transmitted from the places where it can be developed to the railroads, where it can be used and where locations for plants and transportation facilities may be had.

Beginning on the north, and proceeding southward, the New River is the first of the transmontane streams to engage attention. Nearly all of the locations on this stream which are susceptible of development are to be found on the North and South Forks and will be described later. The first shoal on the main river which deserves mention here is that in the northern part of Ashe County where the river makes a bend into North Carolina. Here for almost four miles the river is a continuous rapid, and there are a number of localities where power could be developed in quantity, especially about Horse Ford. Above this shoal on the main river there are several others where it is known conditions are favorable for development, but concerning which the detailed information is very meagre.

On the North Fork of New River the first power above the mouth is that found partially developed at Dixon's Mill, the developed fall being eight feet, and where the power is reported to be more than 300 horse-power. On this stream also "The Falls" and Sharps Shoal are said to be good locations, but are very inaccessible.

On the South Fork the Wallace Forge Shoal, the Witherspoon Ford Shoal, Dog Creek Shoal, Yates Shoal, Turtle Shoal, Roaring Shoal and Elk Shoal are all good and easily available powers, but as noted before for the sites on the North Fork they are very inaccessible.

The stream next to the south is the Watauga River, draining a total area of 162 square miles in North Carolina. This stream is everywhere a rapid one and for a considerable portion of its course it flows as a series of rapids in a very inaccessible gorge which is very deep and very narrow, and with steep and rocky sides so that a high dam



GREAT FALLS AND BULKHEAD—ROANOKE RIVER—WELDON.

could be constructed at any point desired. Between the Tennessee line and Shulls Mill, a distance by river of about 19 miles, the total fall is 900 feet and the average fall per mile is therefore about 47 feet. The power available on this stream is entirely unutilized, and it will probably remain so until transportation facilities are provided.

On the Toe River and its tributaries large amounts of power are available theoretically, as this stream is a very rapid one throughout its course in North Carolina, and like the Watauga flows at many points in a deep and narrow rocky gorge. There are occasional high floods in which the water rises and falls with great rapidity, and at rarer intervals in the spring there is some little trouble from the breaking up of the ice, which, moving down the stream, forms temporary dams, but this is nothing like so serious as in the more northern States. On this river as on the Watauga it would be a matter of difficulty to name any particular locality, for power can be secured anywhere, and also as on that stream it is at present valueless for the lack of a market.

The French Broad River is more accessible and better known than any of the mountain streams yet described. Throughout the upper part of its course the descent is uniform and the current sluggish so that it may be said that there is no power above Asheville, but below this place the conditions are changed. Between Asheville and Paint Rock there is a total fall of 710 feet and while the declivity is fairly uniform there are a number of shoals of greater or less prominence, and of these that at Mountain Island is the first where there is any noticeable concentration. There is a good power here which could be developed.

Between Hot Springs and the mouth of Brush Creek, a distance of 7.7 miles the total fall is 201 feet, or an average fall of 26.1 feet per mile, and this may be called one shoal for all practical purposes, and would furnish an enormous amount of power if it could all be utilized.

From Brush Creek to Asheville, a distance of 29.3 miles the total fall is 450 feet, the average fall per mile being 15.37 feet, which is well distributed, there being little noticeable concentration of fall on this part of the river, though there are localities where power in quantity can be developed. A power has been developed at Marshall, using about ten feet fall, and only a small amount of water, for the operation of a flouring mill, and a large development has recently been undertaken a short distance below Asheville, where some thousands of horse-powers will be developed and used in the operation of a large cotton mill and transmitted for other purposes. A small power has been partially developed immediately below Asheville, the purpose being to supply power for lights and cars, but nothing has been done in this direction for some time, and power for the above purposes is now obtained from a transmission line from a plant on Big Ivy River a short distance above Marshall, where there is a dam of 95 feet in height, giving a total fall of 110 feet, and developing, it is claimed, more than 2,000 horse-power.

Many power sites are to be found on the Little Tennessee River and its tributaries. The slope of the stream is great, averaging from

ten to forty feet to the mile and localities where large amounts of power could be developed are numerous, such being determined more by topographic conditions than by the amount of fall in the immediate vicinity, and the same is true of the Cheoah River, the average fall per mile on this stream being between 55 and 60 feet. Both these rivers are very inaccessible throughout almost their entire length.

The Tuckaseegee River which is the principal tributary of the Little Tennessee, like the other mountain streams flows for the greater part of its course in a narrow gorge, and there are numerous places where by the construction of dams, excellent powers can be secured. This river is more accessible for a part of its length than the Little Tennessee, as a railroad is built along its banks for some distance.

Of the Nantahala River, which is another tributary of the Little Tennessee River, nothing more can be said than that it is a continuous rapid, with a very heavy fall and that power in quantity could be developed anywhere it might be needed.

On the Hiwassee River the fall is in general well distributed and amounts to about ten feet per mile. Power in some quantity can be obtained at a number of places, none of which can be mentioned by name.

As brief and as general as the above sketch is necessarily compelled to be, it is easy to be seen that the State possesses a great future source of wealth when these water-powers come to be put to the uses which the ingenuity of man will one day find for them. At almost all of the localities mentioned the topographic conditions are such as to make the cost of development comparatively small, building materials of good quality and of abundant quantity can generally be secured in the immediate vicinity, the rainfall is large in amount and well distributed throughout the year, and though the rivers are subject to floods and to periods of low flow, the run off from the drainage area is generally large. Finally, labor is cheap, and the climate mild, not too cold in winter nor so warm in summer as to enervate the operatives.

Now that the movement of the cotton mill to the cotton has begun, it having been discovered that all but possibly the very finest grades of cotton goods can be produced in the South, it is fitting that these powers of North Carolina should be brought before the public, and in the search for powers of considerable magnitude, which can be easily and cheaply developed, which when developed can be made to operate manufacturing plants under the most favorable conditions, these water-powers will receive, in the not far distant future the recognition at the hands of the industrial world to which they are entitled.

In the past one of the greatest obstacles to the development of water-powers in North Carolina has been the grasping and short-sighted policy pursued by adjoining land owners, or by the owners of the privileges themselves, which are often held for speculation at exorbitant prices, the owners regarding them in the same light as they would a rich and productive gold mine. It is rarely the case that it is a necessity in any business to use water as the source of the operative power, and when water is so used it is only because its use costs less than fuel for the development of steam. Nor is it necessary except in

special cases that a manufacturing plant be established in a certain designated locality, for as a rule there are a number of places equally favorable for the transaction of any form of business, or the carrying on of any species of manufacturing. It is not therefore the fuel cost in the locality where the water-power is located that will determine its value to the prospective purchaser, but the cost in the most favorable locality in which he can carry on his business, and no water-power is worth more to any one than that sum of money which capitalized at the prevailing rate of interest will build and maintain a steam plant in the most favored locality for the prosecution of the particular business in which it is desired to engage. It is the failure to recognize this basic principle which has held many valuable water-powers back from development.

Moreover if such a development is contemplated by an individual or corporation, the bottom land, which must be bought for flowage and which has formerly produced but a moderate crop or none at all, at once assumes a wonderful value in the eyes of the owner, and is sometimes hardly to be purchased at any price. This very fact has undoubtedly prevented the establishment of important enterprises. It would seem the better plan for the farmers whose lands are desired to encourage by all the means at their command the establishment of such, for while the gains of the average farmer located far from a market are apt to be small, they are sure to be increased by the establishment of manufacturing villages and towns which require to be supplied with farm products, and which therefore open up opportunities for gain which were impossible before. Not only this but the establishment of such manufacturing towns leads to a substantial increase in the values of real estate, and for the sake of the advantages which will surely accrue to them, there are times when it is good policy to give to good companies without charge the flowage rights which they require.

North Carolina can supply many powers which are sufficient for the needs of a single mill, and there are within its borders others which are of magnitude great enough to supply the needs of a great manufacturing city. Minneapolis and Holyoke, Manchester and Lewiston, Lowell and Lawrence, Bellows Falls and Rochester, the great manufacturing cities of the United States, owe their growth to the water-power available in the streams on whose banks they stand. Fall River, in Massachusetts, where the prices of cotton cloth throughout the entire country may be said to be fixed, owes its growth entirely to the water-power to be found there, for this, while amounting only to some 1,300 horse-power, was early utilized by a number of cotton mills which were found to be so profitable that a large number of mills using steam-power have been built, and a great manufacturing city has grown up about them in course of time.

North Carolina can supply powers as large as the largest noted above and many as large as the smallest, and yet with the exception of the power at Niagara Falls these are the largest developed water-powers in the United States. That North Carolina has now within her borders no Minneapolis, no Lowell nor Manchester, is entirely

owing to the conditions which have been prevalent among the people of the Southern States for many years, and from which they are just beginning to awake, but the awakening has begun, and in the days that are not far in the future the hum of the spindle and the clatter of the loom, the roar of the blast furnace and the clash and clamp of iron works and machine shops will be heard in spots which are now waste places, and each such will call into being a busy town.

Already much capital has been invested in the State, mainly in the manufacture of cotton goods, but many other industries have had a beginning. In 1870 there were only 40,000 spindles in the entire State, while in 1895 there were 156 cotton and woolen mills in active operation. 11 new mills in course of construction, and a number of others projected. These mills contained 913,458 spindles and 24,858 looms, and represented an invested capital of $15,000,000, giving employment to 15,752 persons, and using possibly some 30,000 horse-power, of which 33 per cent. was obtained from water. In 1897 there were 210 mills, containing 1,044,385 spindles and 24,517 looms, with an invested capital of $17,242,950, giving employment to 26,287 persons, and using about 43,000 horse-power.

As an example of the benefit which a manufacturing enterprise may be to a community by putting money into circulation the following may be cited. The mills in Richmond County paid out in five years a total of $2,063,720.59, distributed as follows:

Cotton	$1,458,346 59
Wages	577,542 31
Taxes	14,215 69
Wood	13,616 00
	$2,063,720 59

As will be seen nearly every cent of this has gone into the pockets of the citizens of the county.

That the industrial awakening of the State must be accompanied by the development of its water-powers is a foregone conclusion, for power is a necessity in all manufactures, and the greater part of the power to be used in North Carolina must be derived from the water flowing in the streams of the State, for the supplies of coal to be found within the State are small in quantity and poor in quality. With increasing competition the cost of fuel will become even a more serious item than at present, and it will be necessary to put the water-powers to use as a measure of self-defense against those mills located where coal is very cheap, instead of very dear as in this State. Moreover the tendency of the coal market is apt to be ever an upward one as the depth of the workings increases.

Practically the sources of energy upon which man has to rely for the operation of machinery and the performance of useful work are limited to fuel and water-power. Owing to conditions now prevalent within the State many mills using steam as the source of power use wood for fuel, and draw the supply from the country nearby, but owing to the vast demands which are constantly being made in various

ways on the forest resources of the State, this supply will be exhausted before the expiration of a great number of years, and it will be necessary to either use coal or find some other and cheaper source of power, and water-power will fill this need.

Formerly in comparing water-power with steam the most striking point of difference and that which constituted the great advantage possessed by steam was that it was mobile and could be obtained and used in any place where fuel could be obtained, independently of any particular location. Mills using steam power could therefore be located in places suitable for the most economical production and disposal of the finished product, while those using or desiring to use water-power were compelled to build where the power was located and were thus placed at a serious disadvantage. Convenient transportation facilities constituted therefore a most important factor affecting the relative value of water-power and steam-power, and many water-powers technically available were rendered valueless for the lack of this essential element.

This is, however, no longer true, for water-power is now as mobile as steam for it can be developed and transmitted electrically to very considerable distances, with little loss and at a comparatively low cost, and as an added convenience it can be divided and subdivided at will, so that a single line of shafting or even a single machine can be operated without reference to the remainder of the mill, heavy and cumbersome belts with all their attendant dangers and disadvantages are done away with, danger from fire is eliminated and finally many electrically-driven machines will do more and better work than they will do when any other form of motive power is used.

Water-power may be developed and transmitted from eighty to one hundred miles and still reach the consumer at a less cost per horse-power per year than would be necessary to develop the power on the spot from coal or other fuel.

Very few users of power have any idea as to what their power costs them. They know, of course, the amount annually expended on the plant for fuel, maintenance, interest, attendance, taxes and insurance, but what they do not know is the amount of power they receive in return for this expenditure, and so they cannot tell whether they are operating as economically as possible or not. Moreover, it is not an economical measure to take a gatling gun to kill a mosquito and it is no more economical to operate a 250 horse-power engine constantly, when for a large part of the time possibly one of 50 horse-power will do the work as well. The conditions have been reversed, and now the user of electrically transmitted water-power pays only for the actual power used in the operation of his machinery, while the user of direct steam power pays for what he wastes as well through uneconomical loading of the engines and boilers, and this latter item in many cases constitutes a very large proportion of the annual cost for power.

In a presentation of the advantages of water-power as compared with steam for purposes of manufacturing, it is therefore necessary to show that the former is in almost every case the cheaper form of power, and consequently some figures as to relative cost of development and operation will be of interest.

From the length of time during which steam has been in use as a motive power it would be supposed that there would be definite data at hand from which, given the cost of fuel in any individual case, the annual cost of steam power per horse-power could be accurately and certainly computed. Many tests have been made looking toward this end and the results so obtained are to be relied upon when the conditions under which the tests were made are complied with in practice, but there are in the steam boilers of commerce such varying ratios of grate to heating surface and of either to the quantity of water to be evaporated, that the general problem is as yet of uncertain solution. The rate of combustion of the fuel is a varying quantity, as is also the composition of the fuel itself, for fuels differ widely in their heating capacity and firemen differ widely also in their ability to secure the best results from a given fuel. The temperature at which the gases of combustion are delivered into the atmosphere will also have a large effect on the economy of operation, and even the state of the atmosphere itself is not without effect.

When all these factors enter the question it is easily seen that the best that can be done is to give the results obtained by those who have made the matter a subject of special study, and who have determined the cost under stated conditions.

The following results have been reached by Dr. C. E. Emery as to the cost of horse-power per year, the capacity of the engine on which the experiments were conducted being 500 horse-power, run with full load ten hours per day for 308 days in the year, the price of coal being $3.00 per ton.

Kind of engine.	Cost per horse-power.
Simple low speed engine	$34 20
Simple low speed condensing	26 76
Compound condensing	25 53

In ordinary practice the cost may be taken as from 25 per cent. to 50 per cent. greater than this, since it is unusual for engines to run continuously at full load, the stoking is apt to be carelessly done, and it is certain that the average engine does not measure up to its rating.

After considering the efficiency of the various forms of heat engines, Dr. Louis Bell summarizes the results obtained by him as follows, coal being taken at $3.00 per ton as before.

Kind of Engine.	Cost per horse-power per hour. Full load.	Cost per horse-power per hour. Part load.
	Cents.	Cents.
Large Compound Condensing....	0.8 to 1	1 to 1.5
100 Horse-Power, Simple.....	1.5 to 2.5	3 to 5
20 Horse Power or Less	7 to 12	12 to 20

Thus to develop 500 horse-power by means of a compound condensing engine running at full load for ten hours daily for 308 days in a year, as before, would require a total expenditure of $13,860, or $27.72 per horse-power per year, while to operate the same engine with partial load might run the cost per horse-power as high as $46.20.

For a simple engine, non-condensing, of 100 horse-power, the cost per horse-power per year according to the results given above will be $46.20; while operating under partial load the cost may be as high as $154.00.

These figures do not include interest on the original cost of the plant or any of the other fixed expenses with which the plant is necessarily charged, and the addition of which would increase the figures as given above.

The most thorough investigation of the cost of steam-power with which the writer is familiar, is that carried out by Professor Unwin, an English scientist of brilliant attainments, and which are partially given in his book "On the Development and Transmission of Power." The following tables are taken from this source, the figures, however, being changed from English money to dollars and cents.

"The probable cost of steam-power in any given case can only be determined by careful estimates in which local conditions are taken into account. The cost of coal, facilities for obtaining water, the cost of labor, even the type of engine and the character of the buildings required are more or less different in different cases. Further, the way in which the power is applied, the number of hours the engine is used per day, and the regularity of the load during working hours affect very much the cost. Certain typical cases may, however, be taken and an average estimate made of the cost in such cases. This will afford some indication as to how far motive-power supplied from central stations by some method of transmission can be used economically, in place of power generated locally by steam engines.

"COST OF ENGINES, BOILERS AND BUILDINGS.

"With engines of 100 horse-power or more, the cost can be pretty definitely stated, and the total cost of engines and boilers per horse-power does not vary very greatly with the type of engine adopted. For if a cheaper and simpler type of engine is selected, then, its efficiency being less, the boilers have to be larger. But with small engines the cost per horse-power increases very considerably because small engines are are less efficient, and because they are more expensive to construct.

"It will be assumed for the following estimates that the total cost erected of engines and boilers with pipes and auxiliary apparatus and such buildings as are necessary, may be taken as follows:

"COST OF STEAM PLANT.

Indicated H. P.	1	10	50	200
Effective H. P.	0.7	7.5	40	165
Cost per Indicated H. P. in dollars	272.72	146.10	116.88	97.46
Cost per Effective H. P. in dollars	389.60	194.80	146.10	121.75

"In determining the annual cost interest will be taken at 5 per cent. and maintenance (repairs) and depreciation at 7½ per cent.

"COST OF COAL AND PETTY STORES.

"In the following estimates coal will be taken at 20 shillings ($4.87) per ton. The amount of coal required must be calculated so as to allow for lighting up boiler furnaces, for waste and for cooling of boilers and brickwork when steam is let down, and for working auxiliary apparatus, such as feed pumps.

"WORKING COST OF STEAM PLANT.

Indicated H. P.	1	10	50	200
Effective H. P.	0.7	7.5	40	165
Coal per I. H. P., lbs.	8	5¼	2¾	2
Coal per E. H. P., lbs.	11½	7	3½	2¼

"The cost of petty stores (oil, waste, etc.) will be taken as 0.25£ ($1.22) per effective horse-power per annum in the case of moderately large engines working ten hours per day. In other cases a proportionate estimate will be made.

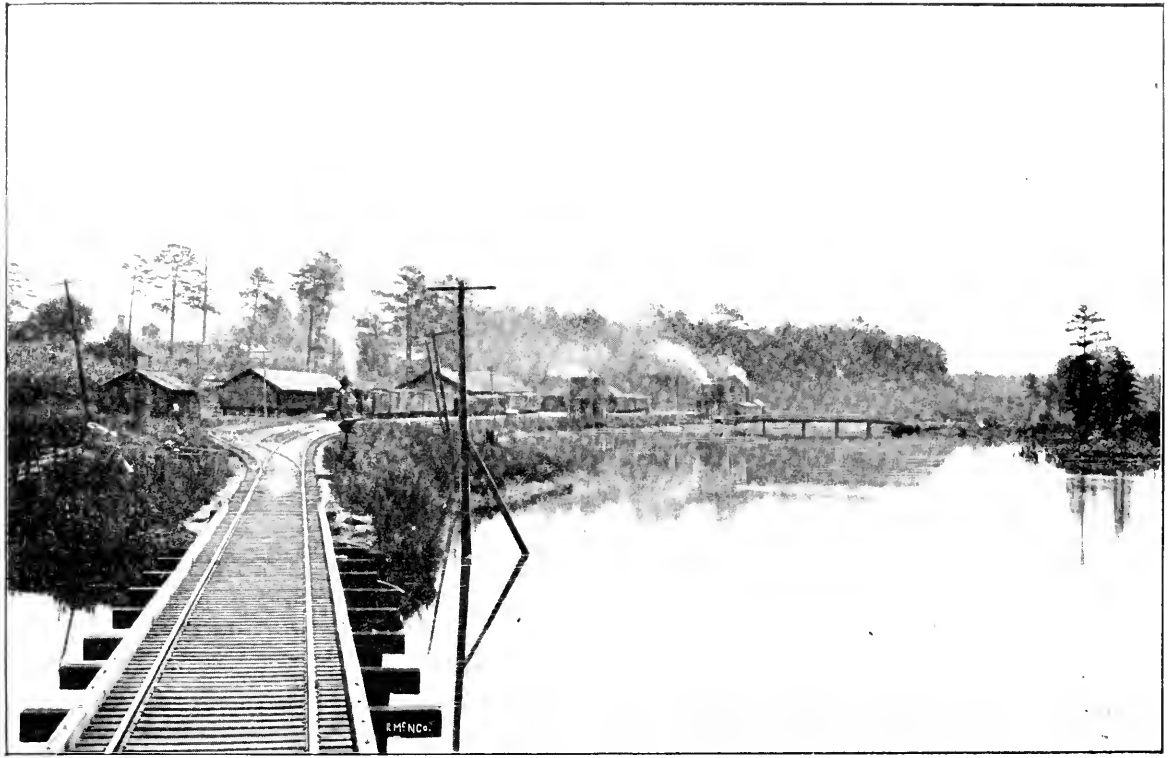
"COST OF LABOR.

For driving, stoking and cleaning an allowance of 1.2£ ($5.84) per annum per effective horse-power for 3,000 hours or 0.6£ ($2.92) per annum for 1,000 hours will be made. In the case of engines of 10 horse-power or less, however, the labor reckoned on the horse-power cost considerably more.

"COST OF AN EFFECTIVE HORSE-POWER PER YEAR OF 3,000 WORKING HOURS, THE ENGINE WORKING REGULARLY WITH NEARLY FULL LOAD.

Indicated H. P.	1	10	50	200
Interest at 5 per cent. on engines, boilers and buildings	$ 19 20	$ 9 74	$ 7 30	$ 6 09
Maintainance and depreciation at 7½ per cent	29 22	14 61	10 96	9 15
Coal at $4.87 per ton	74 95	45 78	22 79	14 76
Petty Stores	3 65	2 19	1 46	1 22
Labor	60 87	29 22	7 30	5 84
Total cost of an effective horse-power per year of 3,000 hours, in dollars	$187 89	$101 54	$49 81	$37 06

If coal be taken at $3.00 per ton instead of at $4.87, the other items remaining the same, then the cost as given above for engines of 200 horse-power will be reduced to $33.22 per horse-power per annum which does not differ very greatly from the results given above as obtained by Dr. Emery and Dr. Bell, and the difference may easily be accounted for by the higher prices assumed for labor and for first cost of plant, and also from the fact that these estimates include items for



ROCKINGHAM—CAROLINA CENTRAL RAILWAY.

interest and depreciation, which are not taken into account in those given before.

Before the electrical power from Niagara Falls was introduced into the City of Buffalo a very careful estimate of the cost of steam power in that city was made, and it was found to cost from $45 to $60 per horse-power per annum for days of 24 hours, coal being very cheap and the units large.

Mr. John W. Hays, in an article appearing in the Manufacturers Record of March 14, 1901, gives the following as the average cost of operation of steam plants in the Southern States:

"A compound condensing engine and standard boilers cost for operation in the South about as follows, estimate based on coal at $3.50 per ton, plant to run eleven hours, 308 days, 1,000 horse-power indicated.

Items.—	Cost.
Coal	$13 00
Wages	2 00
Supplies	2 50
Insurance, taxes, renewals	2 00
Interest	2 50
Total per I. H. P.	$22 50

"If the plant and management is not the very best, this low cost will not be realized. I am aware that these figures are occasionally reduced. There are steam mills in the South which claim to produce their power for $20 and for less, even as low as $15. But usually they are mistaken, the power being reckoned at the nominal rating of the plant and no estimate being made for renewals. Steam power will be found to cost $30 oftener than $20, even with condensing engines. And with engines and boilers of inferior efficiency the cost of steam may run as high as $60 per horse-power per year."

Before these figures can be directly compared with those given above, the indicated horse-power must be reduced to effective horse-power, which it is thought, for large engines will be as much as 0.9 of the amount indicated, and this will raise at once the cost to $25.00 per horse-power, which may still be regarded as low, lower than the average.

Steam power is expensive, for no matter how cheaply coal can be purchased, it is always at a price, labor has to be paid to put it in the furnace to be burned uneconomically, and the engines and boilers deteriorate and have to be kept in repair and finally renewed.

Water itself costs nothing, the water rights once bought, a well built masonry dam is practically indestructible and costs nothing for repairs, and though water wheels will wear out after a time and need replacement, still water-power is cheap power, which may be obtained wherever there is water in sufficient quantity, and some place over which it can be made to fall, and it may be used wherever desired.

In making a comparison it is not just to compare the most favorable results obtained with one source of power with the most unfavor-

able obtained by using the other, and therefore in the case of steam only those results were given which have been reached in practice, and which with care may be attained in any locality. The same course will now be pursued with reference to the cost of water-power, although in this case it will not be possible to pursue the same method, for each water-power presents different conditions which affect the total cost of development and the annual cost per horse-power developed, so that this cost cannot be tabulated as has been done in the case of steam. However a number of results obtained in actual developments will be given, and in many cases where it is not possible to do this the cost at which the power is sold can be obtained and it is a fair presumption that it is not sold at a loss.

Proceeding from the general to the particular, it is stated by the General Electric Company in one of their circulars, that a fair average cost of developing a water-power may be taken about as follows:

Development of water-power . . .	$50 00 per horse-power
Water rights and incidentals . . .	60 00 " " "
	$110.00

For a plant to develop 500 horse-power then the entire first cost will be taken as $55,000 and the operating expenses may be tabulated as follows:

Interest and depreciation at 10 per cent. . . .	$5,500 00
Attendance	1,000 00
Maintenance	1,650 00
	$8,150 00

If the efficiency of the plant be taken at 84 per cent. then the cost per horse-power per annum will be about $19.40, and it is certain that the cost is less than this amount in a large number of cases, and probably in all cases in the Southern States.

It is estimated that the power at Lawrence, Mass., where the development work cost complete $130 per horse-power, costs now to produce about $13.70 per horse-power per year.

A number of figures will now be given, showing the rates at which power is or has been sold at a number of places in the United States. At Lewiston, Maine, the price for water-power per horse-power per annum ranges from $1.87 to $9.37; at Turner's Falls, Mass., the usual rate is $7.50 per horse-power, and the same rate is said to prevail at Bellows Falls, Vermont. At Cohoes, New York, the annual charge for power amounts to $14.67, that at Lockport is said to cost from $8.33 to $11.11, while at Patterson, N. J., the price varies from $36 to $50 per annum, and at Augusta, Ga., the price per horse-power has been as low as $5.50 per year. At Weldon, N. C., water-power is now sold at the rate of $15.00 per horse-power per year, this including a building site with a service of 24 hours, and electric power is furnished at the same rate for a 20 hour service. In the list given above it is not in all cases known for how many hours daily the power may be used, but in some of the instances it is known that it may be used for the full 24 hours, if so desired.

If it is desired to transmit a water-power electrically, then according to the circular of the General Electric Company before referred to, the cost of the plant complete may be about $175 per gross horse-power, and if the efficiency of transmission be taken as 80 per cent. the development cost will be about $220 per horse-power delivered, and allowing 15 per cent. for depreciation and operation expenses, the total cost per electrical horse-power delivered will be about $33.

Under favorable circumstances, however, the cost will be very much smaller than this. Within recent years a plant has been constructed near Butte, Montana, to transmit 3,750 horse-power for a distance of 21 miles, which cost complete $400,000, or $106.66 per horse-power. If operating expenses and depreciation are estimated at 15 per cent. as before, the power ready for distribution costs $16 per year per horse-power. The Fries Manufacturing and Power Company have developed a water-power on the Yadkin River, and transmit 1,000 horse-power a distance of 13.5 miles, at a total cost of $125,000, or $125 per horse-power delivered, the tested efficiency of the plant being 88.5 per cent. This power is furnished to consumers at $20 per horse-power per year for a 12 hour service, and at $40 per year for a 24 hour service.

The Niagara Falls Power Company has offered developed water-power at $13 per horse-power per year, and electric power at the generator at $18.

In connection with the relative cost of water-power, either used direct or electrically delivered, and the cost of steam-power, the advantages gained by the electric distribution must not be lost sight of. The convenience, safety and economy of space of the motor are sufficient to decide in favor of the use of electricity, even where it can be obtained no more cheaply than steam-power, but there are very few places where steam-power can be developed cheaply enough to prevent electric power from finding a market in small amounts, even at $50 or $75 per horse-power per annum.

When the power is to be used for 24 hours daily the advantage of of water-power, either direct or transmitted, becomes even more apparent. In a steam plant all the operating expenses increase in proportion to the time of operation except interest, taxes and insurance, while with the water-power plant only attendance, depreciation and incidentals increase in proportion to the time run.

In considering the availability of a water-power for a manufacturing enterprise its value must of course be determined, and while this is primarily an engineering question, a few words showing the principles on which any valuation must be based, will not be out of place here, even though every case presents problems peculiar to itself.

It has been common to say that the value of a water-power was represented by a sum of money which when put at interest would build and maintain a steam plant of the same power in the same place. For example it is proposed to purchase a water-power of 100 horse-power, and it is reasoned that taking into consideration the cost of fuel at that place and the other running expenses, a plant developing 100 horse-power from steam at that place would cost $50 per horse-power,

or that the running expenses of the plant will amount to $5,000 per annum, and this capitalized at 5 per cent. equals $100,000, which is commonly said to represent the value of the water-power. This reasoning appears sound on the face of it, but it will appear upon examination that it has no foundation and that probably there are no sets of conditions under which it will hold good. Let it be supposed for instance that the water-power referred to above is located in the mountains of North Carolina twenty miles from a railroad, for which distance it would be necessary to haul fuel for a steam plant, and also to haul away all the products of the plant. It is evident then that the further from the railroad the water-power was located the greater its value would be. In other words if it were absolutely inaccessible it would be priceless.

The true principle has been stated already in this paper in these words, "It is rarely the case that it is a necessity in any business to use water as the source of the operative power, and when water is so used it is only because its use costs less than fuel for the development of steam. Nor is it necessary except in special cases that a manufacturing plant be established in a certain designated locality, for as a rule there are a number of places equally favorable for the transaction of any form of business, or the carrying on of any species of manufacturing. It is not, therefore, the fuel cost in the locality where the water-power is located that will determine its value to the prospective purchaser, but the cost in the most favorable locality in which he can carry on his business, and no water-power is worth more to any one than that sum of money which capitalized at the prevailing rate of interest will build and maintain a steam-plant in the most favorable locality for the prosecution of the particular business in which it is desired to engage."

The above definition is true only on the supposition that the facilities for obtaining raw material and disposing of the finished product are equal for the two places, and that the other factors are as favorable in the one place as in the other. In such a case there will be nothing to choose between the locations, but if the water-power can be secured for a less sum than is indicated, other conditions remaining the same, then its purchase will be in the light of an investment.

The value of a water-power depends very largely upon the quantity of water flowing in the stream, its uniformity of flow for the year and for a succession of years, and upon the available fall, for upon these things depend the cost of construction and the necessity for an auxiliary steam plant, and other things being equal the value is largely dependent on the location, this value ranging from nothing at all to the value given above, in which it is understood that the water-power includes both the cost of the water rights and that of the development work necessary before the power can be used.

FORESTRY.

THE forests of North Carolina are and have for many years been one of the chief resources of revenue to the people of the State, their products including domestic fuel, timber for construction and such forest by-products as turpentine and its derivatives.

The forests, which extend from the sea level in the eastern and southeastern sections to altitudes of 6,600 feet along the State's western borders, where the Appalachian upheavals reach their culmination, are made up of more or less distinctly marked regions having different kinds of trees, the different growth being due to the changes of temperature as the elevation varies and to the succession of different soils. There are three of these regions mostly clearly marked: the Coastal Plain with upland forests chiefly of pines; the Piedmont Plateau with forests of pine mixed with hardwoods, or belts of hardwoods with pine, alternating with belts of hardwoods without pines; and the Mountain, the forests of which lying above 2,000 feet elevation are destitute of pine.

The richness of the sylva of North Carolina, almost unequalled in the variety of hardwoods and conifers by that of any other region in temperate climates having an equal area, is unapproached by that of any other State or Territory. The great variety of soils and climate has brought together trees from all parts of eastern America so that twenty-four kinds of oaks are to be found in the State, which is three more than occur in any State to the north of this one; and two more than are to be found in any State south of this one; of the nine kinds of hickories known to occur in the United States, eight are to be found in North Carolina; here are all six maples of the eastern United States, all the lindens, all six of the American magnolias, three of the birches, eight pines out of eleven, both species of hemlock and balsam-fir, three elms out of five, six arborescent species of plum and cherry and three of pyrus (apple).

In the eastern and particularly the southeastern part of the State, at the mouth of the Cape Fear River, the warm air, seldom below freezing, enables numerous trees which extend farther south, to Florida, Texas and even Mexico, to here make their northern limits, or to extend but little farther to the northward. This is the case with the palmetto, prickly ash, American olive (devil wood), mock orange and live oak, trees which, in this State, occur only along and near the coast, but extend southward to Florida or to Texas. The bleak and exposed mountain summits, on the other hand, bear forests of trees which there find their southern limit, but extend northward through northern New York and New England to Canada. Such trees are the black spruce (the balsam), striped and spiked maples, mountain sumac, which is really an apple, balsam-fir and aspen, all unless sheltered by other trees or by the slopes of the mountain above them, rugged and dwarfed from the cold and constant wind to which they are exposed.

Between these extremes, lie the commercial forest trees nurtured under no such adverse conditions. Some of these trees have wide distribution to the north of this State or to the south of it, or in both

directions, and some of them are restricted in their distribution to North Carolina or to the region around the Southern Appalachian Mountains.

In the Coastal Region, the pond pine, the great tupelo, barren willow oaks, fork-leafed black-jack, over-cup and laurel oaks, are trees which extend farther to the south. The same is true of the long-leaf and loblolly (North Carolina) pines, the first of which trees can be worked for turpentine longer in this than any other State, and the latter forms here more compact forests and reaches a larger size than elsewhere. The southwestern red oak and water bitter-nut hickory (rice field hickory), trees common in the lower Mississippi valley, occur sparingly in this State. The mossy cup, yellow and shingle oaks, white linden and big shag-bark hickory, prominent trees of the central States, extend as far to the southeast as central North Carolina; while trees of the north like hemlock, sugar or hard maple, northern red oak, cherry, birch and white pine, and of the northeast, like the pignut hickory, chestnut, northern pitch pine and balsam enter more or less largely into the composition of the forests of the western parts of the State.

Many trees of wide distribution, and among them some of the most valuable, extend from this State in all directions, the white, post, black, scarlet and Spanish oaks, the red and white maples, the white hickory and brown heart and shag-bark hickories, short-leaf pine, yellow poplar, red cedar, black cherry, and black walnut. The cypress, water and willow oaks, downy poplar, swamp-white oak (Q. Michauxii, Nutt.) Southern elm, and planer trees are trees having a great range to the south and southwest. A few trees are found only in this State, or extend but a short distance beyond its boundaries, the yellow-wood, the large-leafed umbrella tree, the Carolina hemlock, the clammy locust, the last being entirely confined to this State.

Altogether there are 153 kinds of woody plants, which form a simple upright stem and attaining aborescent proportions growing naturally within the State; and of these over seventy are trees of the first size, and fifty-seven are trees of great economic value. Fourteen of these are known to attain in this State a height of over 100 feet, three of them a height of over 140 feet, sixteen of them reach in this State diameters of five feet or over; and five reach diameters of seven feet or over. The largest and finest specimens of individual development are to be found in the extreme eastern and western regions in places where the soils are not only deep and fertile, but where the greater part of the growing season it remains moist or at least mellow. Such conditions are furnished by the lower slopes of the higher mountains, particularly the northern slopes and by many of the swamps of the Coastal Region.

THE TIMBER TREES OF NORTH CAROLINA.

Pinus palustris, Mill., the long-leaf pine, occurs commercially in the fifteen counties of the Coastal Region lying south of the Neuse River, where it is found on the driest and moist soils unmixed with other trees, or on better soils with a lower story beneath the pine of

dogwood and small post and Spanish oaks, the oaks being suitable for cross ties. From this pine, by boxing it, that is removing a thin layer of the sap-wood so that the resin contained in the tree may exude and be caught in a hole or "box" cut in the trunk of the tree near its base, crude turpentine, as the resin is called, is obtained. By the distillation of the crude turpentine, spirits of turpentine is gotten as the volatile part, while rosin is the residue left in the retort.

Pinus taeda, L., the loblolly pine, occurs from the coast as far west as Granville and Anson Counties. The wood is coarser grained than that of the long-leaf pine and is especially suitable for paneling, wainscotting, and ceiling It also makes excellent flooring for buildings when rift sawed as it does not sliver.

Pinus echinata, Mill., the short-leaf pine or yellow pine, as it is usually called in this State, occurs throughout the Piedmont forestral region, and south of the French Broad River in the Mountain Region. The wood is yellow, soft, rather light, even grained and easy to work and is largely used as a building material wherever the tree occurs. It is sawn for shipment but not to so large an extent as either of the pines previously described.

Four other pines occur in North Carolina; one in the Coastal Region, Pinus serotina, Mx., the Savanna pine, and three in the Piedmont and Mountain Regions, Pinus Viginiana, Mill., the cedar or scrub pine P. rigida, the northern pitch pine, and P. pungens, Michx, f., the Table Mountain pine. These are sometimes sawn into lumber, but the trees are small or not common, so the wood is little used.

Pinus, strobus L., the white pine, occurs along and near the Blue Ridge and over local areas to the west of it. It is locally used for building and especially for making shingles and box lumber.

Taxedinum, distichum Rich., the cypress, is one of the largest trees of Eastern America. It grows along the margins of streams or in swamps, and reaches its largest size in swamps along and near the coast, too deep for these trees to reach their largest dimensions. The timber is peculiarly suitable for shingles, doors, sashes and exterior trimming, and a large amount is manufactured in this State for such purposes. Much is also sawn for boat and tank plank, buckets, tubs, etc. On account of its durability in contact with the soil, it is adapted for telegraph and telephone poles, ties, posts, and similar uses. Taxodium distichum and imbricaria (Nutt.) Ashe, is a smaller tree growing in ponds which dry up during summer.

Juniperus Virginiana L., the red cedar, is frequent throughout the State except in the higher mountains.

Chamaecyparis thyoides, (L.), B. S. P., the white cedar or juniper, occurs in swamps in the Coastal Region having a sandy or peaty soil in the eastern zone. It is largely used for wooden ware, shingles, telegraph poles.

Tsuga Canadensis, (L.), Carr., the hemlock, is one of the largest trees in the State, being frequently over 100 feet high and sometimes as high as 140 feet. The most valuable part of the tree is the bark from which is obtained one of the best and most widely known tanning extracts.

Tsuga Caroliniana, Engel., the Carolina hemlock, is a much smaller tree than the preceding and while resembling it some in general appearance, instead of having its height, graceful aspect, is stiffer and looks more like a spruce or fir. The bark has tanning properties similar to those of the true hemlock. Both of these trees are known under the local name of spruce pine.

Picea Mariana, (Mill.) P. S., B., the black spruce or the balsam as it is called in the mountains of the State where it occurs, is found along many of the high mountains, forming on them dense sombre forests.

Abies Fraseri, Pursh, the Carolina Balsam, is found on many of the highest mountain summits. The wood of this tree has considerable resonant properties, and is eminently suitable for the manufacture of sounding boards to musical instruments.

Nine white oaks occur in North Carolina; seven of these are large trees, one is a medium sized tree, and one is a shrub.

Quercus alba L., the white oak, is decidedly the most valuable oak which occurs in this State. It occurs in every county but is most abundant in the Piedmont region, though it reaches its largest size on the lower slopes of the mountains where however above an elevation of 3,000 feet it seldom occurs. In contact with the soil it is one of the most durable woods and cross ties made from it last from seven to eight years. Some rims are made from it and a great many felloes and wagon spokes. Quarter-sawed to show the silver grain, it is used for furniture and office finishing. Its bark is considered one of the best for tanning and it is largely used for that. When the wood is to be bent or split young and vigorous trees are preferred as being more elastic and tougher, many barrel staves being split from it, for which purpose it is preferred to the other oaks.

Quercus monticola, Michx., the rock chestnut oak, is somewhat similar to the white oak in the qualities of its timber; but the wood is darker in color, harder and more difficult to work. This tree grows only in the upper districts, usually along dry ridges with various red oaks, and in such situations becomes only a medium sized oak tree; but along the foothills of the higher mountains, on a more fertile soil, individual specimens are often found five feet in diameter. This tree is rarely unsound, and for this reason is preferred to all the other inland oaks for ties and posts. The bark, which is gray, deeply furrowed and thick, is better than that of all the other eastern oaks for tanning and there are several tanneries in the western part of North Carolina which are extensively using it. The supply in all of the higher mountain counties is large, as in none of these counties has bark ever been gathered.

Quercus Michauxii, Nutt., the swamp chestnut oak, and Q. lyrata Walt., the over-cup oak, are both found in the swamps of the Piedmont and Coastal Regions. It is well suited for furniture and panelling, and large numbers of white oak staves for the West Indies are made from it.

Quercus minor, (Marsh.) Sarg., the post oak, is very abundant on the dry soil throughout the Piedmont Region. In the Coastal, it is

ROAN MOUNTAIN—HIGH BLUFF—EAGLE CLIFF—VIEW FROM ROAN.

frequently found on loamy soils, especially to the north of the Neuse River and in the mountanious region below an elevation of 2000 feet. It is especially suited for ties and posts on account of its small size and the durability of the wood in contact with the soil, where it will remain sound as long as that of the white oak.

Quercus prinoides Willd., the chinquapin oak, is a frequent shrub in the Piedmont Region. The three other arborescent white oaks, Quercus, prinoides acuminata, (Michx.), Ashe, the yellow oak; Q. macrocarpa, Michx., the mossy cup oak; and Q. platanoides, (Lam.) Sud., the swamp white oak, are infrequent trees occurring along streams in many parts of the State.

There are nine kinds of red and black oaks found in North Carolina. Of these only seven can be classed as timber trees and only the first five of those mentioned below are of economic importance in this State.

Quercus rubra, L., the northern red oak, is common in the mountains along moist slopes or at a high elevation, even on dry ridges, and is found as far to the eastward as Wayne County along streams and on rich, cool hillsides. It is considered one of the best woods for furniture making, since it works easily, and takes a good polish.

Quercus volutina, Lam., the black oak, is a large tree 2 to 3 feet in diameter and 50 to 80 feet in height, found in nearly every county in North Carolina, but infrequent in the southeastern counties and around the higher mountains. The wood is not so even grained as that of the northern red oak, which it much resembles, but it is more easily worked and furniture manufacturers in the towns in the middle part of the State find it well suited for their requirements.

Quercus volutina cocinea, (Wang.) Ashe, the scarlet oak, bears some resemblance to the black oak, but is a smaller tree in every way. In North Carolina it is usually called spotted oak, on account of its light gray bark with black stripes or spots on it near the base of the trunk. The wood is coarser grained and more brittle than that of the black oak and is not so highly valued. In many places, however, it is preferred for felys and for clapboards which when made from it are said "to never wear out."

Quercus digitata (Marsh), Suda., the Spanish oak or northern red oak, is a large tree common in the Coastal Region on loamy soils and in the Piedmont Region, but not common in the mountainous. Most of the red oak staves made in the eastern part of the State are from the wood of this tree.

Quercus digitata pago daefolia, (Ell.), Ashe, the swamp red oak, is a tree having a general resemblance to the Spanish oak, but it occurs only on the margins of streams in the Piedmont and Coastal Regions. The wood is similar to that of the Spanish oak, and is put to the same uses.

Quercus Texana, Burkley, and Q. palustris, Duroi, are red oaks found along the streams in the Piedmont Plateau Region.

Quercus Catesbaei, Michx., the forked leaf black-jack and Q. Marylandiaa, Meunch., the black-jack oak, are common on poor land in the Piedmont and Coastal Regions of the State, the first being confined to sandy soil in the latter region.

There are four water and willow oaks in North Carolina. None of them are large trees and all have wood coarse grained and porous and liable to check in drying.

Quercus aquatica, (Lam.), Walt., the water oak, and Q. phellos L., the willow oak, are found throughout the eastern half of the State along and near water courses.

Quercus laurifolia, Michx., the laurel leaved oak, occurs only along and near the coast. Its foliage is evergreen, or nearly so. The wood is somewhat better than that of the water oak and the tree is usually larger.

Quercus Virginiana, Mill., the live oak, is a large tree found only along the coast. It is short bodied, the trunk rarely being over ten feet long, but becomes four or five feet in diameter. The wood is very dark and is susceptible to a fine polish, but is difficult to work and is heavier than that of any other of the oaks of the eastern United States.

Castnea sativa Americana, W. and C., the chestnut, is one of the largest trees in North Carolina, reaching frequently a diameter of seven or eight feet. It makes a good polish and is suitable for cabinet work and interior finishing. On account of its durability it is largely used for ties, telegraph posts and fence rails.

Fagus ferruginea, Ait., the beech, is a medium sized tree occurring along the streams or on wet hillsides throughout the State. The wood of the beech is compact, and difficult to split; in color it is nearly white. It is used for making shoe lasts and tool handles.

Betula lutea, Michx., the yellow birch, is very abundant in the cool, moist hollows of the higher mountains where it reaches a diameter of four or five feet. Its white wood is frequently wavy grained or curly and is largely manufactured into veneering for pianos and furniture.

Betula lenta, L., the cherry birch, is more frequent in the mountains than the preceding tree. The wood, light red in color and susceptible of a fine polish, is sawn in many places on the mountains and used in furniture making, for which it is well suited. From the bark is distilled birch oil, used as a substitute for wintergreen in flavoring.

Betula nigra, L., the black birch, is a small tree, with a porous coarse grained wood, very common along streams in most parts of the State. The wood is well suited for the manufacture of trucking barrels and crates.

The two most common ashes in the State are Fraxinus Americana L., the white ash, and F. Pennsylvanica, Marsh, the green ash, the first being found along water courses in all parts of the State, and the latter in the Piedmont and Coastal Regions.

F. Caroliniana Mill., the water ash, is a small tree growing in deep swamps in the eastern part of the State.

Robinia pseudacacia, L., the yellow locust, is a forest tree, confined to the mountains, where, on rich slopes, it becomes a fir 80 feet high and 3 feet in diameter. The firm wood, which is very durable, is largely used for pins, posts, treenails, and in turnery.

Prunus serotina, Ehrh., the wild black cherry, is found through-

out North Carolina, but it is only on the cool slopes of the higher mountains that it becomes large enough to be considered a timber tree. The beautiful reddish wood is extensively used for making furniture.

Liquidamba styraciflua, L., the sweet gum, reaches a height of 100 and a diameter of 5 feet and ranks among the largest trees. The red or brown wood takes a fine polish, and is used to some extent in the making of furniture and for flooring. In the form of veneer it is largely used for making packing boxes, crates and truck barrels.

Three elms occur in North Carolina, Ulmus Americana, L., the white elm; U. alata, Michx., the Southern elm; and U. fulva, Michx., the slippery elm. The white elm is the largest and most abundant of these trees. It is found in the swamps in the Piedmont and Coastal Regions where it becomes a large sized tree. Except for making hubs and fruit crates the timber is put to but few uses.

Platanus occidentalis, L., the sycamore or button wood, is a large tree, becoming six feet through, found along streams in all parts of the State. The strong heavy wood is used for making boxes for plug tobacco, and quarter sawed, when it shows a beautifully marked grain, for panels for furniture and interior finish. When turned into veneer it shows handsome markings and in this form is used in house finishing.

Juglans cinerea, L., the butternut or white walnut, is not a very common tree even in the mountain counties where it occurs most frequently. The light brown wood is sometimes used for furniture making.

Juglans nigra, L., the black walnut, grows in all parts of the State along streams or in the mountains on rich cool hillsides. In the Piedmont and Coastal Regions there are few trees remaining except around dwellings and along fence rows, but a great many are yet standing in the mountain counties. Trees have been cut in the mountains four feet in diameter and seventy feet to the lowest limb, but the average diameter is not over two feet with a large stem of 40 or 50 feet. It is a tree of rapid growth and would well repay extensive planting.

Hicoria aquatica (Michx. f.) Brit., the rice field hickory and H. minima, (Marsh) Brit., the bitternut hickory, are found along water courses or in moist places, the first only in the southeastern part of the State and the last throughout. H. alba, (L.) Brit., the white heart hickory, is one of the most common kinds and although it does not become as large a tree as the others, has wood of a superior quality, being very elastic and tough. It is preferred to the others particularly for buggy spokes and rims, tool handles and hoops. The other kinds, are however, largely used for these purposes when the white-heart cannot be obtained. H. laciniosa (Michx.,) Sarg., the great shag-bark, is found at intervals through the middle part of the State.

Hicoria ovata, (mill.) Brit., the shag-bark hickory is a large and valuable tree found along streams and on rich hillsides through the Piedmont Region and to a less extent in the mountains. The brown wood splits exceedingly straight and easily and for this reason it is considered excellent for hoops. H. odorata, (Marsh), Sarg., the red heart hickory,

is the common large upland hickory. The wood is considered scarcely inferior to that of the white heart hickory and is put to the same uses.

There are two species of Tilia or linden, whitewood or basswood of the north, which are abundant enough to be of economic value. These are the linden and the white linden, both abundant in the mountains. The wood of both is white and soft, and is used for ceiling, in furniture and buggy manufacture. It also makes good wood pulp. Aesculus octandra, Marsh., the buckeye, has soft wood suitable for ceiling and such uses. It reaches in the mountains a large size, four feet in diameter and eighty feet high, and is abundant there.

There are four large maples in North Carolina. The red maple, Acer rubrum, L., is the most frequent met and is the only one in any part of the Coastal Region. The wood, nearly white, is softer than that of the other species, and is sawn for the finishing of interior of cars.

The Acer barbatum, Michx., the sugar or rock maple, is as abundant in the mountain counties as the red maple in the eastern; it is found to some extent in the middle counties and sparingly in the eastern. The wood is light brown and hard. The bird's eye and curly forms of it are frequently met with. The black maple, Acer nigrum, Michx., is an infrequent tree confined to the mountains. Acer saccharinum, L., the white maple, or hard maple as it is sometimes called, is a large tree with wood something like that of the sugar maple. It is confined to the western part of the State.

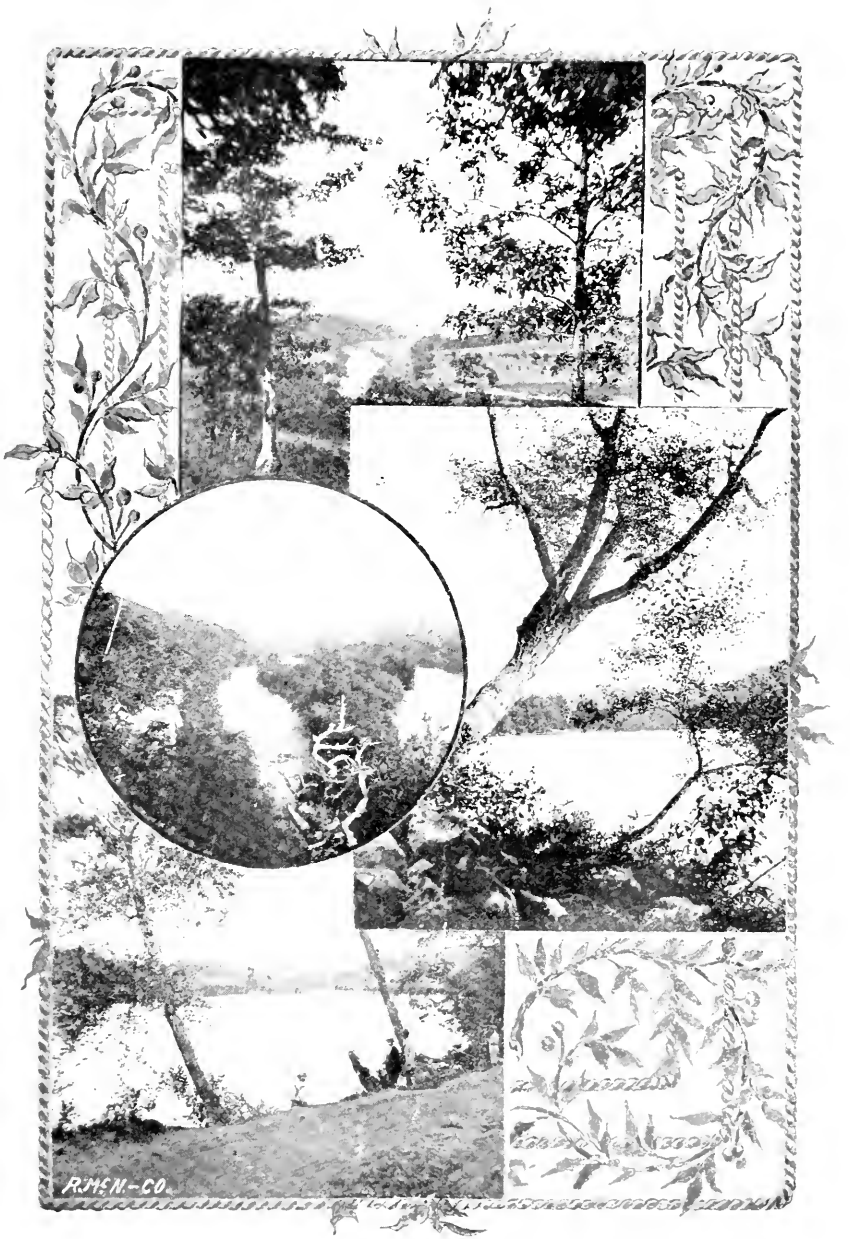
Liriodendron tulipifera, L., the yellow poplar, attains its largest dimensions in North Carolina, where in the mountain counties it grows to a height of 120 feet or over, with a diameter breast high, of seven or eight feet. It is found, however, throughout the State and is largely used for building material, furniture, making packing boxes, crates and wood pulp. Magnolia auminata, L., the cucumber tree, a large tree found frequently in the mountains, has wood similar to that of the yellow poplar and applicable to the same uses.

Hardwood trees, like dog-wood, persimmon, iron wood and hornbeam are frequent in all parts of the State, and the same can be said of sassafras and black gums.

FAUNA.

THE distribution of animal life in North America has been divided into seven life zones. In the sense as used above a life zone is an area of country throughout which the animal and vegetable life is comparatively homogenous, and as such distribution of life is chiefly dependent on equalities of temperature, and as isothermal lines must run more or less parallel with the equator, these areas of country inhabited by living things of similar kinds are necessarily more or less in the form of belts traversing the country from east to west.

The two most northern of these divisions are not represented in our native fauna. They are the Arctic and Hudsonian zones. The former



ON FRENCH BROAD RIVER—SOUTHERN RAILWAY.

lies north of the northern limit of tree growth and the latter embraces the vast spruce forests of Labrador, crossing the continent to Alaska.

The Canadian zone takes in the northern part of New England, New Brunswick, Quebec and northern Ontario, the southern part of Newfoundland, and extends across the continent to the valley of the Youkon, in Alaska, and, in spite of our southern situation, the fauna of this zone occurs in North Carolina along the crests of the Blue Ridge and the Great Smoky Mountains. The boundaries of this division with us are, of course, determined by the altitude, the lower limit being about 4,500 feet, (see Brewster, on Birds of Western North Carolina "Auk," Jan. 1886). Of animals belonging to this fauna and having a range to the far north but occurring in this State, may be mentioned the red squirrel, the "Boomer" of our mountains. Among the summer birds are the Carolina snow bird, mountain solitary vireo, Blackburnian warbler, winter wren, redbreasted nuthatch, etc. It is a remarkable feature of North Carolina animal life that a stretch of country lying between the parallels 34 degrees and 37 degrees, as this State does, should possess among its native animals and birds species that belong naturally to a fauna characteristic of the great forest of Canada and that reaches on its northren border to beyond 60 degrees of north latitude. But to this great degree does the altitude of our mountain peaks modify their southern position.

With its upper limit coincident with the lower limit of the Canadian, we next come to the transition zone. This seems to be a region in which a mingling of southern and northern forms of life is evident although its characeristic life is sufficiently well defined to admit of its recognition as a faunal division. Among the notable animals belonging to this fauna was, in olden times, the elk or wapiti (Cervus Canadensis), noble herds of which ranged the mountain sides and valleys of the western region of the Old North State. But that was long ago, and unless reintroduced and afterwards protected, they will never range those mountains sides again. Here also we find that queer animal, the star-nosed mole, which is found even to the northern limit of the Canadian zone. Among the summer birds are Wilson's thrush, yellow-throated viero, rose-breasted grosbeak. We also find such southern species of birds as orioles, catbird, brown thrasher, and such animals as common mole and cotton tail rabbit mingling with the above. The lower limit of this fauna Mr. Brewster places at about 2,500 feet, but it must be understood that the boundaries of none of these divisions are, or can be, very sharply defined, as there is necessarily a great overlapping of species from one to the other and this overlapping and mixing of the life belonging to one zone into that of another varies very much with individual localities. That celebrated weather prophet, the woodchuck or groundhog, belongs here and is by no means uncommon in suitable localities in western North Carolina.

Next we come to the zone that covers a greater amount of the State area than any other—namely, the upper austral. This is not a projecting spur from more northerly zones running down into the State only by way of the mountain ranges, as were the two former, but is more especially a fauna of the Piedmont Plateau Region and of

the western border of the Coastal Plain Region of the State. It is distinctively Carolinian in its character. The opossum, the gray fox, the fox squirrel are animals characeristic of this division, and among the birds we find such well known forms as Carolina wren, cardinal or red bird, gnatcatcher and mockingbird. The cotton tail rabbit is a common and inextinguishable characteristic feature here, and pretty much the same might be said of our chipper and lively little Bob White,—our partridge in spite of what the "quail" hunters call him.

Beginning near the coast at the extreme northeast corner of the State, running southward and westward and gradually widening on its way down as latitude modifies altitude, we find a strip of country containing life features much more tropical in character than those previously considered. This is the northern corner of the lower austral zone. This zone includes the whole of the South Atlantic coast region, a wide expanse of country bordering the northern shores of the Gulf of Mexico and the whole of Florida with the exception of its extreme southern coast line. The alligator now begins to show himself and is plentiful and attains a large size along the southern half of our tidewater region. Several species of the smaller rodents belong to this zone, notably the cotton rat, rice field rat and wood rat, and the marsh rabbit reaches the northern limit of his range on the coast marshes of North Carolina. The peculiar big-eared bat is found along with the above, and the change in bird life is as noticeable as that in mammals. The chuck-wills-widow takes the place of the whippoorwill, and this zone was formerly brightened by the presence in North Carolina of the gaudy and noisy Carolina paroquet, now, unfortunately, almost confined to southern Florida. The great and rare ivory-billed woodpecker was also a former example of this life division within our borders, found on the coast at least as far north as Beaufort harbor, but his day has also, apparently, gone by. Those interesting creatures the ground and diamond rattlesnakes also come in here, and the cottonmouth water moccasin is their equal as an awe-inspiring upper austral representative. Siren and amphiuma, the latter also called mud eel, congo eel and poison eel are two water animals quite characteristic of this zone, their habitat being chiefly in the sluggish streams and ditches of the tidewater region of the State. The great brown pelican and the swift and graceful swallow tailed kite are both features of this division of animal life and the black vulture, that very useful but not beautiful bird that seems equally at home in the pure ether a thousand fathoms above the earth or in the dark and odorous interior of a dead mule, is always with us.

Economically, apart from the scientific value of a knowledge of the life areas of the State as showing their adaptability for the various crops, the fauna of North Carolina is of vast importance. Thousands —nay, tens of thousands—of our citizens are directly dependent on the products of our waters for their living while every farmer, fruit grower and trucker in the State depends in a great degree on the proper control of the pestilent insect fauna of the country for his success in his line of work. Another feature in the business prosperity of the State dependent on our animal life, is the amount of money distributed

within our borders by the visiting sportsmen from other sections who come here to hunt and fish.

By a careful study of conditions necessary for a proper protecting of the game and by treating the wild animal life as the valuable asset that it really is, this game interest may be made a veritable gold mine with us here as the State of Maine makes hers now.

But enough of this brief sketch; it will have served its purpose if it is even the remote cause of a wider knowledge of and an increase in the investigation of our native fauna and some intelligent application of such knowledge.

FLORA.

THE flora of any region includes the indigenous or native plants, and such foreign species as have been introduced and show their ability to maintain themselves without cultivation. The specific constitution of a flora depends firstly upon the climate, and secondly upon the geology of a district A third modifying force is composed of numerous smaller factors of less importance than either of the above, but which in the aggregate amount to a very considerable influence. Among such factors we may enumerate the following: (1) Age and condition of civilization. (2) Density of population. (3) Methods of agriculture. (4) Presence or absence of trunk-line railroads and long navigable streams.

The total number of distinct species of plants usually growing within a circle of twenty-five miles diameter, in a fertile and well varied district, is from 1,000 to 1,200, not including microscopic fungi, lichens and algoe.

The great naturalist, Humboldt, classifies vegetation as directly affecting landscape, and indirectly human character, into sixteen forms representing as many kinds of climate, First, there is the palm form characteristic of the moist hot climate of the tropics. Associated with this, we usually find the banana which furnishes the chief subsistence of the languid natives of torrid climes. The mallow form—most familiar to us in the swamp hibiscus, the garden, althea and holly-hock, and among economic plants, cotton and okra, is characteristic of a warm, moist climate. The mimosa form—trees with light green pinnate leaves like the black locust—is characteristic of a climate cooler and drier than that in which the mallow form luxuriates. The pine form, including all cone-bearing evergreens, is characteristic of a cold, temperate climate. The aerial orchid form is tropical as are also large leaved herbaceous plants such as the caladium and arum. The trailing form, or vines, is most common in the climate where the mallow form is at home. Ferns, sedges and grasses possess power of adaptation greater than other plant families, but we find these most luxuriant in the torrid zone where grasses become tall, woody bamboos and ferns become trees.

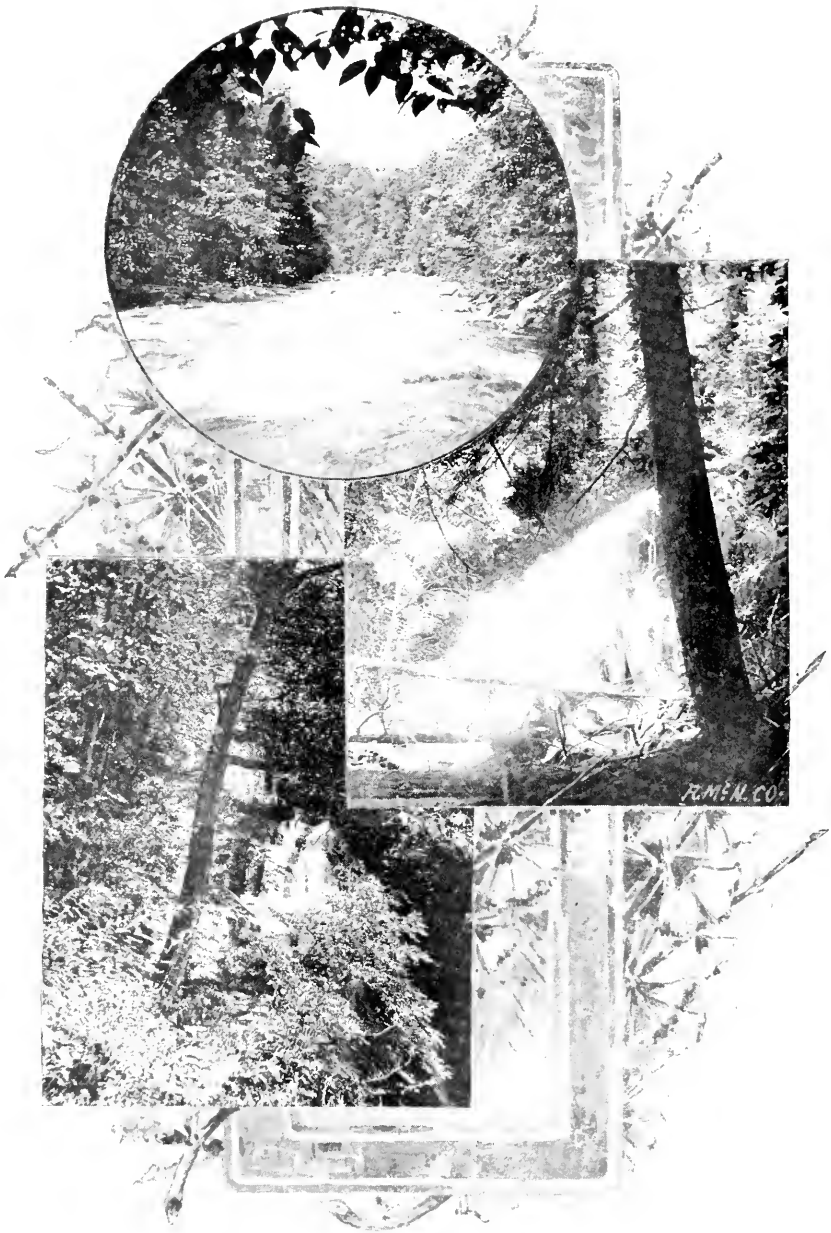
The State of North Carolina lies between the parallels 33 degrees 50 minutes and 36 degrees 33 minutes of north latitude. Its eastern

side, 187¼ miles long, is washed by the Atlantic Ocean, its furtherest western extension is 503¼ miles inland, the average elevation above the sea level is 640 feet. The highest point is Mitchell's Peak, 6,888 feet. Climatically, about two-thirds of the State belongs to the northern or temperate type, and the remainder to the southern or sub-tropical type. The State is divided by geological causes into three well-marked districts each having a distinct and different flora. The Coastal Plain Region consists of a low, sandy plain of about 150 miles in width, which in comparatively recent times, geologically speaking, has emerged from the sea. Extensive swamps fringe the coast along its whole extent.

The long leaf or Southern pine—Pinus Australis, Mx., is the predominant growth, with the loblolly pine—Pinus taeda, Mx. and scrub oak Quercus Catesbaei as secondary factors. The herbaceous growth is chiefly wire grass—Aristida sticta, Mx, and A. purpurea, Mx. Plants of the composite or aster family abound in their seasons, the most common genera being Chrysopsis, Silphium, Aster, Peterocaulon, Helianthus and Liatris. Leguminous plants, chiefly Lupinus. Tephrosia and Stylosanthes abound, but as a whole the drier portion of this region is very poor in species. Along streams, "branches" as they are called, we find a more luxuriant growth. Here, in addition to the above species, we find among trees and shrubs oaks of many species, Sour Gum, Nyssa aquatica L.; Sweet Bay, Gordonia Lasianthus, L; and its close relative Stuartia Virginiea, Cav.—both of which belong to the camellia and tea family. The "he-huckleberry," Cyrilla racemiflora, Walt., abounds and the great bay, Magnolia grandiflora, L., comes almost to the Cape Fear River.

The palmettoes, Sabal Palmetto, R. & S. and S. Adansonii, Guerns, come as far North as the Cape Fear River. Among under-shrubs, the most common genera are the blue-berries, Vaccinium and Gaylussacia; stagger bushes, Andromeda; sumachs and related genera; the spice bush, Clethra; button bush, Cephalanthus; yopon, Ilex; alder, Alnus; pepper bush, Itea, and Jersey tea, Ceanothus. Among the climbing vines, we find in profusion the grape Vitis, four species; Smilax, seven species; Clematis, two species; Virginia creeper, trumpet flower, Tecoma; cross vine, Bignonia; Carolina jessamine; wild ginger, Decumaria; and passion flower, Passiflora incaranta. L. The Southern cane grasses, Arundinaria gigantea and A. tecta, cover the banks of streams to the nearly complete exclusion of other species of this family.

In the swamps the prevailing trees are the bald cypress, Taxodium distichum, Rich, and white cedar, Cupressus thyoides, L. Along the coast, live oak Quercus virens, L. occurs. All of these trees within the influence of tide water are apt to be covered by the abundant festoons of the southern long moss, Tillandsia usneoides, L., which is not a moss at all, but an epiphytic plant closely related to the pine apple. We find in wet and boggy situations Saggitaria, Aletris, Tofieldia, Zigadenus, Lachnanthes, Pleea, Xyris, and the very rare spoon-flower, Xanthosma saggitifolia, Schott. Here also we find quite a variety of interesting carnivorous plants. The most celebrated of these is the



FALLS ON QUEENS CREEK RAPIDS—NANTAHALA RIVER.

Venus fly-trap, Dionæa muscipula, Ellis. This does not occur north of the Neuse River nor much below the southern boundary of the State. It is most abundant around Wilmington. Besides Dionæa we find five species of carnivorous pitcher plants, viz. Sarracenia rubra, Walt.; S. variolaris, Mx.; S. flava, L.; S. purpurea, L.; and a doubtful species, S. Drummondii, Croom, near the South Carolina line. There are also four species of sundew, Drosera filiformis, Raf; D. longifolia, L; D. rotundifolia L.; and D. brevifolia, Ph.; Pinguicula lutea, Walt; and P. elatior, Mx. together with the closely related bladderworts, Utricularia inflata, Walt; U. vulgaris, L; U. subulata, L. and U. cornuta. Mx. complete the list of carnivorous or insect eating plants found in this district. In like places we find a great abundance of bull-rushes, Juncus, 10 species; cat-tails, 2 species; sedges, including about 18 genera and 110 species. Of grasses, besides the canes, Paspalum, 10 species; Panicum, 25 to 27 species; Uniola, 3 species; Andropogon, 7 species; Erianthus, 2 species; Elymus, 2 species; Aristidia, 5 to 6 species; Sporobolus, 3 species; Leersia, 4 species and Zizania, 2 species.

The upland regions have been more thoroughly cultivated than either of the others, and the result is that the indigenous growth has been here largely destroyed or supplanted by introduced species. This is a country of rolling red clay uplands. Cotton, tobacco, grasses and cereal grains are the chief staples. Oaks, hickories and elms are the predominating trees with short leaf pine—Pinus mitis Mx. on the ridges separating the water sheds of different streams. The flora is a mixture of the flora of the eastern and western districts with a very large per cent. of introduced species familiar to dwellers in the Middle States and Europe.

The Mountain Region of the State includes the foot hills and all the valleys and domes of the Blue Ridge and Smoky Mountains. This region has been until comparatively recent date quite inaccessible, and hence the original growth is still everywhere to be seen. The predominating forest growths are oaks, hickories, black-walnut, chestnut, cherry, white poplar (Liriodendron), magnolias—five species, in valleys; and white-pine, white spruce, hemlock spruce and balsam fir on the higher peaks. On the middle terraces birches, limes, elms, ashes, maples, and willows complete the very northern forest flora. In this case the high altitude gives us a climate equivalent to that which high latitude gives to more northern States, and the forest growth partakes of the same character. The undergrowth, both shrubby and herbaceous, is however, very different from the corresponding flora of northern climes. Here beneath a characteristically northern forest growth we find a typical southern undergrowth. Besides the gorgeous flowers of the semi-shrubby magnolias, we find in profusion the even more striking bloom of the rhododendrons, of which there are eight native species. Here is the original home of the Rhododendron catawbiense, Mx. the parent of our finest cultivated rhododendrons. Of kalmia or "calico bush" there are three species, and related genera of the Ericaceous family almost too numerous to mention.

Cranberry bogs are frequent. Stuartia pentagyna, spirers of several species, hydrangea, two species, and Viburnum, eight species, are

very abundant. The service berry—Amelanchier, is much esteemed for its fruit. This is usually obtained by cutting down the tree which here grows 25 to 30 feet high. Among the climbers are grapes, three species; trumpet flower; Virginia creeper; honey-suckle, three species; smilax or green brier, three species; moon seed, (Menispermum); poison sumach; Decumaria barbata, L.; wild ginger or dutchman's pipe, Aristolochia sipho, L'Her, and Virgin's bower Clematis, two species.

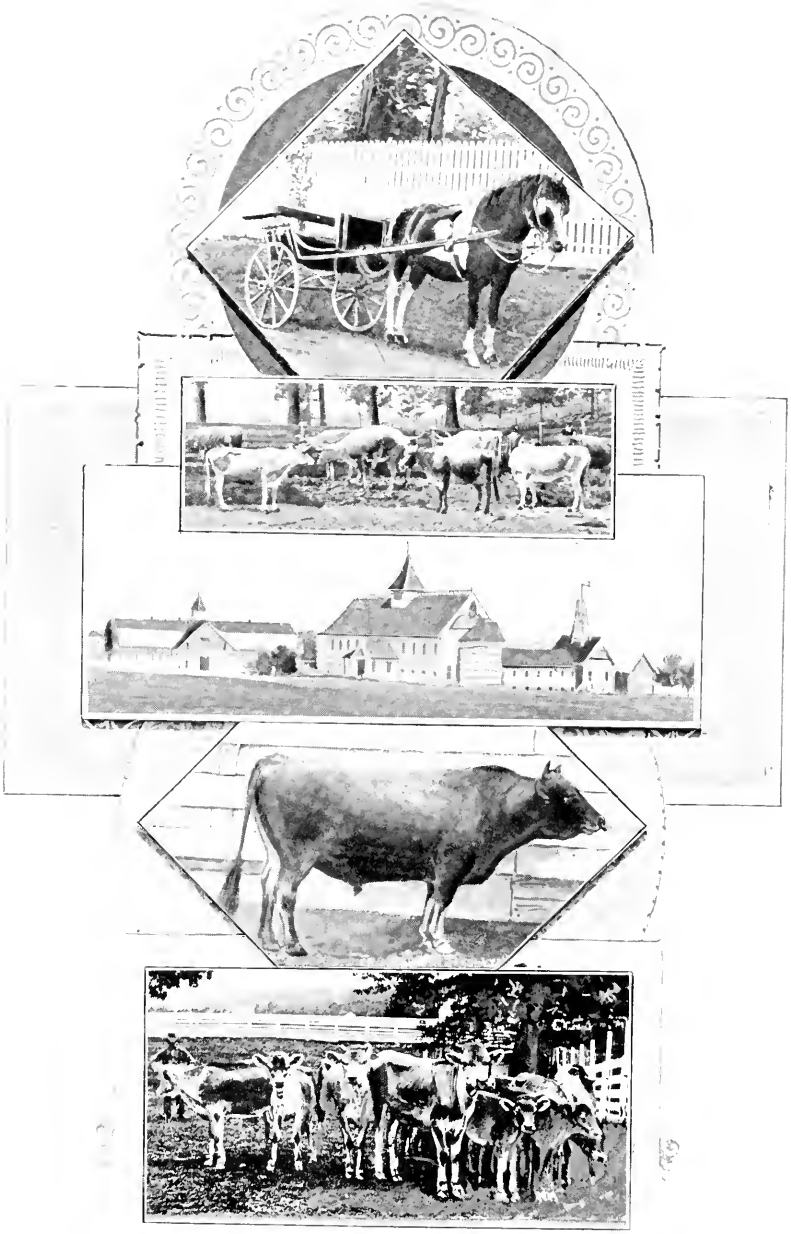
The herbaceous growth is particularly rich in composite plants. Nearly all the Northern and most of the southern species of aster and solidago, or golden rod, abound. In early summer travelers by railroad often pass for miles through lands thickly covered by the bright yellow flowers of Senecio aureus, L, var. tomentosus, Mx, supplanted later in the season by Bidens and Coreopsis. In cool moist spots violets abound in great profusion. Fifteen species are found, all of which grow to an unusual size. On rocky cliffs we find plants of the saxifrage family everywhere. The most common genera are Saxifraga, five species, Astilbe; Heuchera, five species, Tiarella and Mitella. The pink family is represented by Silene, five species; Alsine, three species; Spergula and Paronychia. The beautiful evergreen, round leaved, Galax aphylla, L. is fairly common. The long lost and much sought for plant Shortia galacifolia, Gray, has been found in several places. Lily of the valley; terrestrial orchids, Lilium, three species; Trillium, five species; Acorus, Orontium and Arisaema are all very common. The partridge berry, Mitchellia; and liver leaf, Hepatica with various grasses and ferns form the ground carpet.

At the cryptogamic flora of the State, we can only glance. Of ferns our flora numbers 38 to 40 species. Ground pine, (Lycopodium,) ten species; liver-worts, 70 to 75 species; mosses, about 200 species; lichens, about 220 species; algae and sea-weeds, about 50 species; fungi, 2,500 species, of which more than 100 species are edible mushrooms.

The total number of species of plants recorded from this State is about 5,500, but as the cryptogams have not been very exhaustively investigated, it is likely that the number of recorded species will eventually exceed 6,000.

No State in the Union, nor any country of similar area anywhere, can show a flora which contains a greater number of indigenous plants of high economic value. From early colonial days until very recently North Carolina has been the chief source of the yellow pine lumber and naval stores consumed in or exported from the United States. This business has now, however, passed to virgin forests further south. Our swamp lands still yield largely of cedar, cypress, gum and similar valuable timbers. Our mountains still contain vast quantities of the most valuable hard-wood suitable for furniture and cabinet work. This State has for years furnished the main supply of the sweet chestnuts sold in the stores—the spontaneous product of our mountain slopes.

For decades North Carolina has been the chief source of the national supply of crude vegetable drugs. This industry has reached an extension and volume which few outside the medical and pharma-



OCCONEECHEE FARM SCENES.

ceutical professions appreciate. The number of distinct species of important medical plants found growing wild in this State is about seven hundred.

AGRICULTURE IN NORTH CAROLINA.

A State occupying the geographical position of North Carolina and stretching from the high mountains of the west down the sunny slope to the sea, where her coast extends further out towards the Gulf Stream than any point north of Florida, will naturally possess a great range of soils and climates. On the northwest we find the high mountain valleys and plateaus where the fir, hemlock and white pines of the north flourish, and on the lower coast the live oak and the palmetto give a semi-tropical appearance to the landscape. This variation in climate is of course accompanied by a wonderful variation in soils and products. In the short seasons of the elevated valleys of the northwestern part of the State it needs a quick maturing corn like that of Canada to make the crop, while in the southeast corner the ribbon cane of Louisiana flourishes, and great rice plantations border the rivers.

Extending for a hundred miles or more inland from the coast we find the great level coast plain, with a soil generally of a sandy or alluvial nature. Included in this area are great stretches of black peaty soil of inexhaustible fertility, and vast unreclaimed swamps which some day will be drained and become like Egypt in productiveness.

The farm crops of the coast plain are cotton, corn and tobacco. Only in recent years has the great capacity of the soil of this region for the production of the gold leaf tobacco been fully realized, and it has now become the most important crop over large sections of the more sandy country. Many years ago the late Edmund Ruffin wrote a book on Eastern North Carolina in which he said that he thought the coast plain was destined to be the greatest stock country on the Atlantic coast because of the wonderful profusion of the native grasses. From that time down the farmers in this favored region have been trying to kill the grass in order to grow cotton, while the grass with live stock would have made them rich. But a change is gradually taking place and the farmers here and there are beginning to realize their error and are devoting more attention to stock.

The black moist lands of the eastern section have been largely used for the cultivation of upland rice, and the crop has considerable commercial importance, and could be developed to a much greater extent since the plant thrives there wonderfully well. But with the great profusion with which grass grows on these lands, and the capacity of the soil and cilmate for the growth of the cow pea and other forage plants the feeding of good beef cattle should become a leading interest in the coast plain.

The greatest development in the coast region has been in market gardening and small fruit culture, of which we will speak elsewhere.

The level and mellow character of the soil and the mild climate are conditions which should make this favored region the agricultural paradise of the South when once the farmers realize their advantages and farm the land in a systematic manner. The warm and mellow soil responds at once to manures and fertilizers, and the forage crops that can be produced would excite the envy of the stock feeders of the west, and all right where cattle are sent abroad without crossing the continent. We have named a few of the crops that are grown in the coast plain and should have added that in the northern part of the region the peanut crop is a very important and profitable one when well grown.

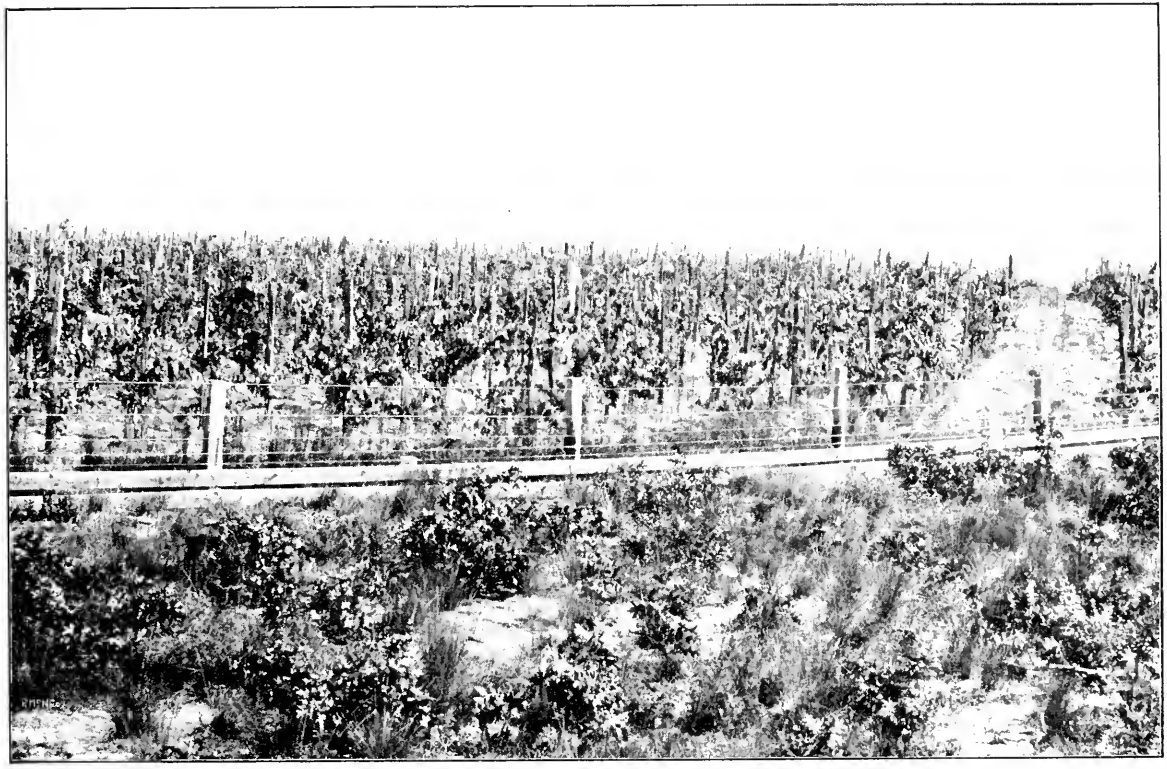
LOWER PIEDMONT.

The first uplift of the land into a rolling upland constitutes what is known as the lower Piedmont country, a section in the central and more southern parts of which cotton has reigned king, and the improvement of the soil has been largely neglected. In the northern part the culture of tobacco has been accompanied by a similar neglect of the improvement of the land. The results of the continuous cultivation of the rolling uplands in cotton has been to cause them to wash and gully badly in many places. But when these hillsides are protected by terrace banks and the red sub-soil is loosened it is found that there is a rich and productive soil right beneath where the little cotton plow has been scratching the surface.

Included in this region is the vast expanse of the long leaf pine country known as the Sand Hills. For generations this section was looked upon simply as a place to get lumber and turpentine. Of recent years it has been found that the climate and sandy soil were favorable to the recovery of patients suffering from throat and lung troubles, and many people from the north, finding that they could live in comfort there have settled permanently on the Sand Hills. Wishing to grow something, they soon discovered that the apparently barren soil had a capacity for the production of fruits that is wonderful when aided by commercial fertilizers. Grapes were the first of the fruits tried and they flourish better than anywhere else in the State. Then other fruits were tried and now the peach industry has developed to a great commercial enterprise and is growing annually in importance, and the Sand Hills will soon become the leading fruit region of the State.

UPPER PIEDMONT.

Stretching in an irregular way across the State from northeast to southwest is a scattered range of hills marking the line between the lower and upper Piedmont regions. These hills are known by various names, from North Southward, as Rougemont, Occoneechee, and Uwharrie Mountains. Along this line are most of the falls of the rivers making in many cases wonderful water-powers. East of this line of upland ridges the country seldom rises more than 500 feet above the sea level, while west of the hills the land rapidly rises in swelling uplands towards the Blue Ridge. The country extending from the line



SAND-HILL LAND IN VINEYARD—SEABOARD AIR LINE.

of the Uwharrie and Occoneechee hills to the Blue Ridge constitute the great agricultural region of the State. In its northern part grain, grass, cattle and tobacco are the leading interests, and in its southern extension cotton still reigns supreme. From an elevation of 700 feet the country gradually rises to an elevation of 1,500 or more as the foothills of the Blue Ridge are reached.

This whole rolling country was evidently designed to be a great grass, grain and stock region, and in some parts great crops of wheat have been grown, notably in Davidson county, where the late Governor Holt made over 46 bushels of wheat per acre over an eighty acre field. The most of the soil of this region is a red clay loam interspersed with areas of a gray soil with a yellow subsoil. Both characters of soil are well suited to the growing of grain and grass and the production of forage for stock feeding. The gray soils are the best tobacco land and produce a very fine quality of the yellow tobacco which brings a high price on the market. In the northwest portion of this upper Piedmont section a different kind of tobacco is grown for the making of plug tobacco. This cures a rich mahogany color and is in much demand. The largest nurseries in the State are in this section, in the neighborhood of Greensboro, and many thousands of fruit and ornamental trees are there propagated and distributed. One of the most interesting smaller divisions of this section is a limited area in the upper part of Davie County, around the village of Farmington. There in an area of about ten miles square is a comparatively level soil of an inky black color, which seems to be especially adapted to grass. Wherever it is left uncultivated the soil naturally sods over with a great variety of the sweetest grasses, and here should be the finest stock farms of the State. As yet little is done there in this direction, though the land will make as rich a sward as the far famed blue grass country of Kentucky. This small area is evidently the bed of an ancient lake. Here and there in the Piedmont country attention is being paid to improved stock and to the dairy. One of the largest and most successful dairies in the State is that of Moore near the City of Charlotte, where from a very small beginning a milk trade of $10,000 a year has been established. In the county of Rockingham too, there is attention being paid to live stock and improved breeds of beef cattle have been introduced and are thriving, especially the Polled Angus breed. The whole of this region is adapted to the highest development of general agriculture, and there is a spirit of improvement abroad and an earnest desire to learn improved methods of farming. The great increase in the number of cotton factories all through this section of the State is giving a great impetus to the production of food crops for the population drawn from the farms and now centered about the mills. In the cotton growing section the farmers are slowly beginning to realize the importance of a diversified rotation of crops, and they are annually growing more and more of food for man and beast. The cow pea, the "Clover of the South" is being more and more extensively grown both as a hay crop and a soil improver. The red soils of this section are of the same uniform character all the way down to the fast rock, and can be plowed as deep as a plow can be drawn, and farmers here and

there are discovering this fact and are trying to develop the new farm that lies right below the scratch plowing of past generations.

THE MOUNTAIN REGION.

West of the Blue Ridge Mountains and extending to the Great Smoky Range on the Tennessee line, lies a wonderful region of high plateaus and fertile valleys watered with the clearest of streams, a natural paradise for the stockman, the dairyman and the sheep breeder. In addition to this it is the finest apple region of America, but as yet little developed in this line. In the elevated table lands of Henderson and Transylvania Counties, where by reason of the elevation the climate partakes more of the character of the Middle States north of us, there has of late years grown up a great business in gardening for the Southern market with such crops as late cabbage and potatoes that cannot so well be grown in the warm section of the South. Of this development we will speak more in treating of the horticultural capablities of the State. More beef cattle are produced in the mountain country than in any other section of the State. This is particularly true of the counties of Ashe and Allegheny in the northern part of the mountain region, and it is also true of Macon County on the southern end of this section. The mountains through this region known as "Balds" furnish a rich pasturage for large herds during the summer and the abundant grass crops of the valleys enables the stockman to feed large numbers for the Southern market. The openings for stock breeding and feeding and for dairying all through the mountain country are wonderful and as yet but poorly appreciated. This region could easily supply all the rest of the State with the finest of beef and the best of butter, and yet there is little enterprise in this direction. This region is annually attracting great numbers of summer visitors from all parts of the country by reason of the magnificence of its natural scenery and the delightful coolness of the summer climate, and this influx of visitors will of itself make a home market for all the food products of the farm. Volumes have been written about this beautiful "Land of the Sky" and if the proposed National park is established, there will be thousands more of tourists attracted here and the feeding of the multitude should bring wealth to the cultivators of the soil.

LEADING CROPS.

Cotton.—While the greater part of North Carolina is a little north of the true cotton belt, the State has nevertheless always produced a large amount of the staple, and over a large section of the State cotton is the true money crop. This is particularly true of the Coastal Plain where soil and climate both favor the production of the crop. But the cotton farmers have as a rule been planters rather than farmers and have relied upon the getting of a crop by the use of commercial fertilizers rather than through the practice of a systematic rotation of crops for the improvement of the soil. With the low price of cotton of late years there has been more of an effort made to produce the food supplies of

the farm and there is slowly growing up a disposition to diversify crops and to look to the improvement of the soil. There is hardly any land in the Coastal Plain especially, where the cotton crop could not by good farming and a proper rotation of crops be brought up to at least a bale per acre, while with the system, or rather the no system in vogue the product is far below this. It is said that the product of lint or the proportion of lint to seed is larger in North Carolina than in any other State. Under the present methods of cultivation there is too much of a disposition to estimate the crop as so much to the mule rather than so much per acre of land. Of late years the cotton seed crop has attained a degree of importance it did not formerly have. The establishment of oil mills all through the cotton growing section has enabled the growers to get profit out of the seed which they did not formerly realize. But this fact tends also to show the importance of good farming, for while the lint makes a light draft of the capacity of the soil the seed draw heavily on its store of plant food, and if they are sold off the farm they exhaust the soil very rapidly. The true method should be to exchange with the oil mills and get back the meal and hulls to return to the soil after feeding with other forage crops to stock, so that the manure can be returned to the land. At present large quantities of these are sent North and to foreign countries, while all should be retained in the South to prevent the exhaustion of the soils.

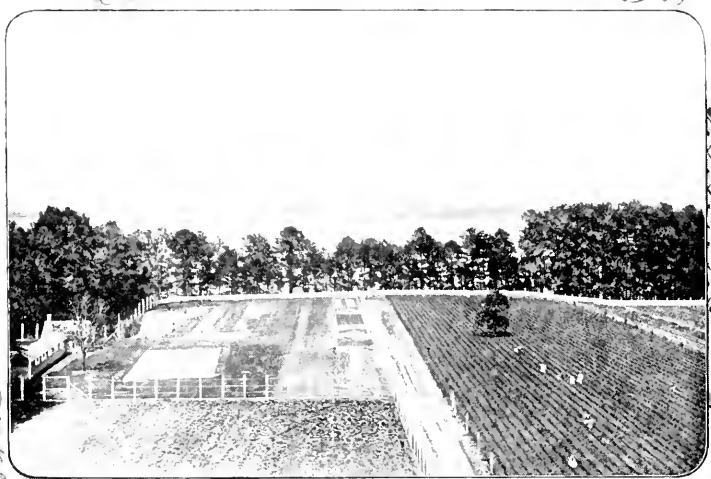
Tobacco.—No State in the country excels North Carolina in the production of fine tobacco for cigarette and plug manufacture. The culture was formerly confined on a large scale to the northern tier of counties of the Piedmont section but of late years it has extended into the Coastal Plain and that section has become the largest tobacco producing part of the State. The gold leaf tobacco of North Carolina has always had a great reputation with smokers and formerly brought very high prices. Then there came a season of depression and the product was largely reduced. But the past season has witnessed a great revival in tobacco culture and better prices for the growers, and the coming season will see a great increase in the acreage all over the State. The growers of the bright tobacco have always had a notion that the crop will not associate with improved farming, and that if the land was too highly improved it will not produce fine tobacco. But some are beginning to realize that improved farming is just as possible with tobacco as with any other crop, and that land that is adapted to the production of a certain kind of tobacco will grow that kind no matter how highly improved. The tobacco crop of North Carolina sells for more money than that of any other State in the country because of its superior quality for smoking purposes. The cigarette business of the world has been built upon the gold leaf of North Carolina, which also gives quality to all the smoking tobacco used.

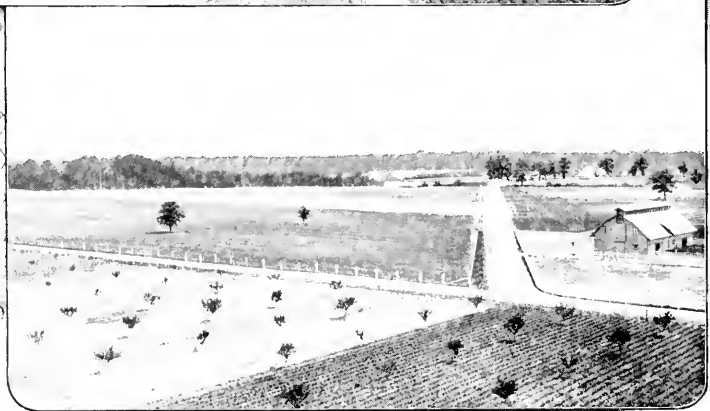
Rice.—The rice lands of the lower Cape Fear River were formerly more largely cultivated than at present, as many plantations were allowed to go down during the war, and have not been reclaimed since. The plantations that are still cultivated in the crop of irrigated rice produce excellent crops, but there is a tendency to turn these lands to grass.

culture and pasture for stock since the competition of the Louisiana rice lands renders the crop less profitable here. The upland rice crop is produced all over the Coastal Plain Region, and while the grain is not so fine as the river rice nor the crop so large per acre it is grown at far less cost and is in many sections a profitable crop. Lands formerly in rice along the Brunswick River near the City of Wilmington are now used to feed dairy cattle for the Wilmington milk trade. The great cost of diking, ditching and irrigating the river lands has prevented the reclamation of large areas, and the fact that on the low prairie lands of the Gulf coast in Louisiana the crop can be produced at far less cost that here is rapidly leading to the abandonment of irrigated rice in the South Atlantic region. The yearly crop of river rice in North Carolina and of upland rice is stated to be 6,000,000 pounds and the crop is grown on 12,200 acres. There are rice mills in several sections for cleaning the crop.

Peanuts.—Peanuts flourish in all parts of the State on suitable mellow soils. But the crop assumes commercial importance only on the level sandy soils of the Coastal Plain, and is more largely grown in the counties bordering on southeastern Virginia than elsewhere. Here as with the cotton growers in other sections the peanut growers have been in the habit of relying too much on commercial fertilizers and have been planters rather than farmers. There is hardly any land in eastern North Carolina which is adapted to peanuts on which by good farming 100 bushels per acre may not be grown. And yet the average crop is probably less than 25 bushels per acre. Like the tobacco growers in some sections, the peanut growers have a prejudice against the cow pea which is the true soil improver of the south, and particularly of the light warm soils on which the peanut thrives best. It has been proven in several instances that the true method for improving the peanut crop is to practice a good rotation of crops, growing forage for feeding live stock and so increase the humus content of the soil that lime, which seems particularly needed by the crop will have material to act upon and will produce better results Two classes of peanuts are grown, the large white or Virginia nut and the Spanish or upright growing sort. This last is considered by many as the most profitable as it is productive and more easy to harvest and is in more demand for the manufacture of oil. North Carolina produces over half a million bushels of peanuts, and by good farming the same area ought to produce three or four times the crop now grown.

Indian Corn.—The Indian corn crop is annually becoming of more importance in the State as farmers in the cotton region realize the importance of growing more food crops and feeding more stock. The introduction of the corn harvester and the shredding machine, by which the crop is husked and torn into a feed similar to hay are rapidly enabling farmers to feed cattle to better advantage on the corn crop than they could in the old time expensive way of saving the fodder and wasting the stalks. By degrees the cutting of the crop off at the ground and saving the stover in good shape is becoming more common. These improvements do not come rapidly by reason of the great conservatism of the farmers as a class, and the lack of means with many to buy the machinery





GLENOE STOCK FARM—NEW RIVER—ONSLOW COUNTY.

BEAN FIELD—ATLANTIC COAST LINE.

needed. But diversified farming has taken hold in North Carolina and the development while slow is steadily onward. Years ago, and but a few years ago, in all the towns of North Carolina one could find in the provision stores only the meat of the western packing houses and the hams of southeastern Virginia. Now in every provision store one sees large quantities of North Carolina cured meat exposed for sale. And the fact that so much is found in these stores shows that the farmers as a class are no longer depending on the western meat but are raising a surplus over their own needs.

What North Carolina needs more than anything else is men of means who have faith in the soil and who are willing to invest their means in improved farming. The curse of the State, especially in the cotton growing sections, is the cropping system, in which the tenants skin the land to raise cotton on shares and pay enormous percentages to the merchants who "carry" them through the cropping season. It is a hopeless system both for the land and the tenant, and no real improvement can be hoped for until the whole system is abandoned and men cultivate the land in a farmer-like manner and those without means work for cash wages rather than the uncertain method of cropping. When men who have means to farm right realize that the hope of the State lies in proper farming and see that there is profit for them in such farming, we may hope to see a rapid improvement in the crops and farming. Nothing shows the wonderful recuperative power of the lands of North Carolina more than the way in which they have sustained the treatment they have received. Here and there, where men have invested their means wisely in the improvement of the soil the results of good farming have been as good as in any State. Down in the level sandy soils of the lower coast Mr. Thos. McIntyre has established successfully a stock farm where fine horses and cattle are bred as profitably and successfully as anywhere. In fact in this mild climate stock raising can be done far more cheaply than in the cold climate of the North, for there is hardly a day in the winter when the cattle may not be on pasture.

On the waters of the Eno River, the upper tributary of the Neuse, Col. J. S. Carr, has one of the finest stock farms to be found anywhere, and the Occoneechee farm products have made themselves a name.

Not far from this, and in the same county of Orange, near the University Station, Mr. W. Duke, of Durham, has a magnificent stock farm, which is being profitably managed on business principles and is rapidly becoming a model for any section.

Westward of these farms there are here and there a number of places that are being improved. In the neighborhood of Charlotte, Mr. C. C. Moore, has made one of the most notable successes in the dairy business. Starting years ago with one cow, one horse and a buggy and less than $100 in money, Mr. Moore has by careful management and attention to business, and the study of modern dairy practice, developed a milk business that now brings in $30 a day.

There are other dairies growing up in various sections and the time is not far distant when North Carolina will supply the butter and

milk for her people who are not getting butter from abroad and being swindled with oleomargarine. With the success of the National law against the coloring of oleomargarine the dairy industry in North Carolina will receive a great impetus and will become one of the most important farm interests in the State.

An expert dairyman from Vermont removed a year or more ago to Georgia, and lately gave me his experience in the South. He said that he found that he can make as good butter in the South all the year through as he made in Vermont, his feed cost him less to grow, and was produced in greater abundance and hence the milk cost less, while the price he gets for his butter is far better than he got in Vermont. The ease and profusion with which forage can be produced here with the cow pea and soy beans and crimson clover makes us the envy of the Northern farmers who cannot grow near as much forage in the same time with their crops. The Northern farmers are eagerly trying our cow peas and are succeeding in growing them, and find them profitable. If they can find them profitable we, where they grow far better, should realize their value.

STOCK FEEDING IN THE COAST PLAIN.

In no section of the State are the conditions for successful stock raising and feeding more favorable than in the level lands of the Coastal Plain. It is here that the cow pea and the soy bean attain their highest development, and the great Indian corn can be grown in abundance, The mild winter climate enables the stockman to have green pasturage all winter by the use of winter oats, rye and wheat with crimson clover or vetch. The natural growth of crab grass on all improved soils furnishes abundant hay to balance the ration with the pea vine hay and to make up whatever the corn and the peas may lack. Then if more protein is needed the numerous oil mills in the section furnish a cheap supply in the cotton seed meal.

The food supplies are here in abundance and all that is needed is the introduction ot improved beef breeds of cattle, and the handling of the crops in better shape. There is in the corn crop alone in eastern North Carolina waste enough to feed all the beef cattle needed by the towns of that section. The introduction of the corn harvester and binder and the shredder will enable the farmers to economize in this respect. There is no section of the State where the conditions for successful stock raising are so favorable as in the Coast Plain.

With the introduction of systematic feeding of improved beef cattle the other crops of the farms could be immensely increased while the area devoted to them could be lessened.

HOG RAISING.

What has been said in regard to the capacity of the Coastal Plain for stock feeding in general applies with particular force to the raising of hogs. In no part of the whole country can a greater variety of products be more cheaply grown for feeding hogs than in eastern North Carolina. Pigs dropped in February or March can be kept

BARNARD FARM—IOTLA VALLEY, MACON COUNTY.

thriving all through the season on a succession of products that are cheaply grown and will need but little corn to fit them for the market. Hogs can be raised here cheaper than in the west, where hog raising is an important business. With artichokes for them to root up in the winter, clover and vetch for spring and early summer grazing, followed by cow peas, and these by sweet potatoes and peanuts the pigs will grow rapidly and healthfully till late fall, when a little corn will round them up and leave a good margin of profit for the work. Then too, the curing of bacon after the manner pursued in southeastern Virginia can be made as profitable here as there. As we write these lines the finely cured and smoked hams of southeast Virginia are being retailed in Raleigh for twenty-two and a half cents per pound, while the product of the western packers is bringing fifteen cents. But the farmers of North Carolina have imagined that smoking is not essential to the making of a good ham, and the white tried hams of the country sell for about the same price as the western hams or sometimes less. If cured and smoked after the Virginia plan there is no reason why the North Carolina product should not sell for as much, for the conditions are the same in eastern North Carolina as in Virginia where the famous Smithfield hams are produced. With hogs raised cheaper than they can possibly be raised in the West, and home cured bacon selling for far more money than the packing house product there is a wide field for enterprise in the raising of hogs and the curing of the meat in eastern North Carolina.

SHEEP RAISING.

Here, too, the conditions for success are excellent all over the State. The eastern section is particularly well situated to take advantage of the nearness of the Northern markets and the ease of transportation for the growing of what are known as hot house lambs, that is lambs dropped early in the winter and forced all winter in warm quarters for the early spring market at fancy prices. Then, too, with the abundant forage that can be grown the Western range lambs can be bought in carload lots in the fall and fed for yearling lambs for the spring and early summer market. This is now being done with great success in a far colder climate in Ohio, by the use of alfalfa.

ALFALFA FOR SHEEP AND CATTLE.

It has for many years been assumed that the crop of alfalfa was only adapted to the arid regions of the West, and hundreds of experiments in growing it in the East proved failures. Of late years, however, the conditions for success have been more accurately studied, and it is becoming evident that alfalfa will soon take as important a place in the farming of the Eastern coast as it does in the arid West. In no part of North Carolina are the conditions for success with alfalfa better than in the drier sandy soils of the coast plain. Alfalfa must have a mellow sub-soil into which its roots can penetrate easily, and this sub-soil must be free from water standing nearer than eight feet from the surface. With such conditions and a fairly fertile soil

the crop can be grown with ease. The main reason for the failure heretofore has been that the plants are weak in their early growth and get overtopped and smothered by weeds, and they turn yellow and die. It has been found that when a good stand has been had the crop must be mown two or three times during the first summer as fast as it gets tall enough to clip. This keeps down the weeds and strengthens the roots. Then the following spring a light dressing of lime is spread over the field and success is assured. The wonderful amount of forage that can be cut year after year from a well established piece of alfalfa puts it in the front rank of permanent forage crops.

It should be one of the leading crops on the dryer lands of eastern North Carolina, and there are mellow soils all over the State where it will be as successful as in the East. At the Occoneechee Farm of Col. J. S. Carr, near Hillsboro, alfalfa has been perfectly successful, and in the far West, beyond Asheville, it is being grown with success. Having a stand of alfalfa sheep feeding becomes easy for the hay made from this plant furnishes food that is unsurpassed in quality for sheep, and through the sheep the farm can be made rich.

RAISING HORSES AND MULES.

There is no section of the country where the raising of fine horses and mules can be done more profitably than in the fertile valleys of the mountain region in the valley of the upper Tennessee River, in Macon County, the valleys of the Hiwassee and Valley Rivers in Cherokee, in the high plateau of Henderson and Transylvania Counties, and in fact in all this wonderful region of hill and dale there are thousands of locations where breeding farms could be profitably managed. This is being done to some extent in Macon County, and should be done more largely elsewhere. The mules used on the cotton farms are brought from other States, while they could as easily and profitably be raised here, and a large business be inaugurated not only with the cotton farmers of the State, but with those further South. The mountain region is pre-eminently the breeding region not only for horses, mules and cattle, but for sheep, as the eastern section is the place for winter feeding, and the two might be made to work in harmony and be a mutual advantage.

THE FARMING OF THE CENTRAL PIEDMONT.

For general farming with grain, cotton and tobacco the great Piedmont country sloping to the sun from the Blue Ridge is the true region for general diversification and high farming. The deep clay loams whose fertility has as yet been hardly touched in the shallow plowing of the past form a soil of unsurpassed lasting quality amd capable of the highest development under a wise system of cultivation. With cotton as the money crop on the southern half of the region and tobacco as the money crop in the northern half, a wise system of farm crop rotation in connection with the feeding of cattle as part of the work rather than a specialty, this whole section should be and one day will be one of the finest agricultural regions in the whole United

States. Wherever the land has had intelligent management the crops will compare favorably with those of any section of the country, and there is not a region of equal extent in the country that would have survived as this has the bad treatment of the past. The soils in some parts have been reduced to an unproductive condition through bad management, but there are really no worn out lands, and all the red rolling uplands can be made to pay for their improvement in crops while being brought up to a high state of productiveness. While in the neighborhood of all the growing towns of this section the dairy can be made exceedingly profitable, it is general farming that should be the rule over this whole wide area. It has been said that the difficulty with the cotton growers of this section is that they raise three bales of cotton for every beef they feed, while the great State of Texas raises three beeves for every bale of cotton she produces. When the cotton farmers of the Piedmont country raise three beeves for each bale of cotton they will raise more cotton than now and produce it on less land.

Here and there the leaven of good farming is working, and this beautiful region only needs the advent of energetic farmers with capital to improve the productiveness of the soil and to make money while doing it. With the rapid increase in manufacturing enterprises all over this section of the State, and the consequent growth of the towns and cities there is growing up a home market that needs good farmers to fill. Every cotton mill built means labor taken off the farms which the farms have got to feed, and the day of the small farmer, the dairyman and the gardener is here and there already arrived, the men are needed, and success awaits them in a hundred localities.

AGRICULTURAL EDUCATION.

There is no one evidence of more interest being taken in the improvement of the soil than the fact that the young men of the State are beginning to realize the value of an education especially directed to the study of practical agriculture. For years past they have been crowding into the mechanical courses of study at the North Carolina College of Agriculture and Mechanic Arts, but now the tide is turning, and there are hundreds waiting and anxious for the College to be enlarged to meet their wants. The College being now under the control of the Board of Agriculture, the members of which are all farmers, a great impetus has been given to the study of agriculture, and as the facilities for this study are extended where there are now less than one hundred students in agriculture there will soon be hundreds earnestly studying how to develop the agriculture of the State. The Board of Agriculture has wisely established over one hundred scholarships by which needy young men are enabled to get through the college and earn their way, and as these young men go out to the farms they will make nuclei of improvement in all parts of the State, and thus the Department of Agriculture, through the College, will be the means of a great development.

FARMERS INSTITUTES.

While in North Carolina there has never been large special appropriations made by the legislature for the conducting of Farmers Institutes as there have been in many other States, the Board of Agriculture has from its own funds endeavored to maintain these great helps for the farmers. Institutes have been held in all parts of the State and in many instances with signal success. An effort is now being made to organize the farmers of every county for mutual improvement, and it is hoped that through these organizations the institute work will become better organized and be the power for good that it should be.

COMMERCIAL FERTILIZERS.

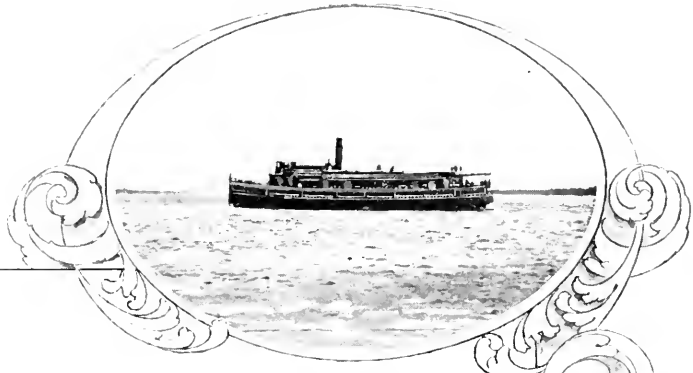
There is not a State in the whole country where the trade in fertilizers is under a more systematic control and supervision than in North Carolina. The result of wise laws rigidly enforced has been that the makers of standard fertilizers have been protected from fraudulent competition and the farmers have been guarded against the swindlers who are ever ready to prey upon them in the sale of worthless articles. No class of the community is more benefitted by the enforcement of the inspection laws than the makers of first-class fertilizers themselves, while the farmer who cannot in the nature of things detect a fraud in fertilizers, is assured of the quality of the goods he buys. Hence the protection is mutual both for the reliable maker and the user of his goods. This is of the greatest importance in the farming of the State, since under the conditions of modern agriculture these concentrated forms of plant food are essential to the improvement of the soil when properly used for this purpose and not merely applied in an indiscriminate way for the chances of getting more sale crops from a run down soil. Used as they have been largely, they have proved a curse to many farmers, but used as they should be the commercial fertilizers will enable the farmer more rapidly to restore his soil than in any other way.

HORTICULTURE IN NORTH CAROLINA.

UNDER this head we mean to include horticulture in all its branches, fruit culture, vegetable gardening and ornamental plant production. In this broad sense there has been a greater development in North Carolina in recent years than in general farming.

TRUCK FARMING.

In the production of vegetables for shipment outside the State there has been a great development in two distinct lines, the production in the warm Coastal Plain of early vegetables for the Northern



TRUCKING AROUND NEW BERN.

markets and in the high Mountain Region of late vegetables for the Southern Coast Regions. In both the increase of production has been marked and is annually increasing. The great trucking region of the State for the Northern markets is naturally the Coast Region, since here the warm mellow soil and mild climate favor the production of the crops of vegetables and small fruits at an early season that makes them profitable for shipment. This production of vegetables is rapidly becoming an all the year business for with slight protection there are some crops that can be produced here all through the winter.

WINTER GARDENING.

Within the past few years, beginning in the more southern part of the Coast Region there has grown up a very profitable business in the growing of lettuce during the winter under a simple protection of cotton cloth. This culture has gradually extended northward until the crop of winter lettuce has become a very important one all over the Coast Region. While ordinarily the protection of cotton cloth has resulted in profitable crops, the day is not far distant when the more progressive and intelligent gardeners will not be satisfied with this but will provide the more efficient and in the long run cheaper article of glass sashes for the lettuce frames. The present hard winter has in many instances proved rather disastrous to the frames under cloth, while those under glass have been eminently successful. When once the gardeners of the State realize the profit that can be made by the intelligent use of glass there will grow up a great forcing business in heated structures as there has in the North, and which our milder climate will make more profitable. Numerous instances have occurred where with the simple cloth cover the growers have realized over $3,000 per acre from the lettuce crop during the winter and spring months, and this is made during a time when the general garden work outside is at a standstill.

Our mild winter climate and the abounding sunshine, even in the coldest weather, give us great advantage over the Northern forcing gardeners who have to contend with colder weather and with long spells of sunless days. All who are accustomed to gardening under glass can understand the value of our sunlight in winter, for it counts for more in plant life than fire heat.

TRUCK FARMS.

The leading sections where trucking on a large scale is carried on are found along the Atlantic Coast Line Railroad from Wilmington northward and in the neighborhoods of Kinston and New Bern on the A. & N. C. R. R., between Goldsboro and Morehead City. Particularly around the City of New Bern has market gardening developed to an immense extent and the vegetable crops cover thousands of acres. The soil in this section is admirably suited to the various crops grown, since there are low ridges of somewhat clayey texture on which the early cabbage crop thrives best, fertile flats of mellow sandy loam suited to a great variety of crops from the early potatoes to the melon

and black peaty lands reclaimed from swamp on which late crops of celery thrive with wonderful luxuriance, and on which when well underdrained the cabbage crop grows immense.

The great extent of the market gardening business around New Bern is a surprise to those who view it for the first time. The leading growers are Hackburn and Willett, Meadows and Company and John Dunn, each of whom cultivate hundreds of acres in vegetable crops and employ hands by hundreds in the busy season. The leading crops are asparagus, early cabbages, early Irish potatoes and muskmelons, while other vegetables are grown on a smaller scale. Early beets and radishes are grown to some extent in frames to forward the crop, but they are also largely grown in the open ground.

The crops of single growers will at times run up to sales of $75,000 or more. New Bern has the advantage of other points in the fact that the growers there can ship by water and by rail also, and thus are not dependent on a single line of transportation and can make better rates. There is also a large laboring population always ready to crowd into the fields. The importance of this abundance of labor will readily be appreciated by those who understand the necessity of plenty of hands in the hurry and push of the truck farm. The great development of the market garden interest in the South has been made possible through the manufacture of commercial fertilizers. But for these it would be impossible, for stable manure could not be had in sufficient quantities for the production of these crops at points distant from the great cities. The truck farmers use these artificial fertilizers in enormous quantities, for they aim to follow their early truck crops by later crops and to keep the land at work during the season. The early cabbages are set in the fall and go to market in April, and often snap beans are planted between the cabbage rows to take the place of that crop later. Then when the beans are gathered and shipped the vines are plowed under and the land harrowed smooth and a natural growth of crab grass comes at once, and later on gives a crop of a ton or more of excellent hay per acre. In other cases cow peas are sown after the early crops and these make an immense crop of excellent hay, so that the truck farmer is enabled to feed herds of cattle with economy and profit. One New Bern firm, Messrs Hackburn and Willett, keep a dairy herd of over one hundred cows and run milk wagons in the City of New Bern and are thus enabled profitably to supply themselves with large quantities of manure which is a great help especially with the cabbage crop which demands something more than artificial fertilizers. Fish oil factories are numerous on the sounds, and the fish scrap is used largely as an ingredient in the fertilizer mixtures. The larger truck farmers all have machinery and steam power for mixing their own fertilizers and they simply buy the materials and mix to suit the various crops grown. The fertilizer bill of the large truck farms will annually foot up many thousands of dollars, and the growers fully understand that lavish use of fertilizers is essential to the production of the best crops, and the repeated crops they get from the land fully warrant this lavish application. The truck crops of the North Carolina section usually come in from two to

three weeks in advance of the trucking region around Norfolk, Va. At New Bern, too, there are many acres covered with cloth for the production of the winter crop of lettuce and the early crops of beets and radishes, and this business has extended to Edgecombe County where a number of acres of lettuce are now produced at a large profit. For more than a hundred miles from Wilmington north this winter crop of lettuce has attained great commercial importance, and the culture is extending to other sections. In the Sand Hill Region of Moore County an enterprising Northern grower has made a profitable business with lettuce under glass and has surpassed those who still cling to the imperfect cover of cotton cloth, and at Raleigh the growing of lettuce under glass for the local market has been made profitable. At Fayetteville there are growers of this winter crop who are doing well too. Over a large part of the State this gardening under glass can be made a great source of profit, for the growers here can compete easily in the perfection of the crop with those in the North who are obliged to use heated houses for the purpose, while here a simple glass sash on a well manured frame is all sufficient for the production of two crops during the winter and early spring. Grown at so slight a comparative expense our growers can afford to produce the crop for far less price than those who grow it in expensive houses and steam heat. When our growers realize the value of glass on frames it will be but a step to the construction of the regular forcing houses and the production of the more tender crops of tomatoes and cucumbers in winter. In the greenhouses of the North Carolina College of Agriculture and Mechanic Arts, tomatoes and cucumbers have been successfully grown, and are now being grown, and it has been proven that they can be grown at a greater profit here than in the colder and more sunless climate of the North, where this business has been very successful, one grower near Boston, having eight acres in heated houses in a climate where more expensive houses and more coal are needed than here. There is no more inviting field for the investment of capital and the employment of skilled labor than in the business of winter forcing under glass in the upper South. This business has developed in the semi-arctic climate of New England, and the products sent to New York from distances as great as from North Carolina, while the expense attending the production there is fully double what it would be here. And yet the growers there are making money, while here far larger profits could be realized. Some day our people will wake up to their advantages in this respect and we too will have extensive ranges of heated glass for the production of crops out of season for which the wealthy people of the great Northern cities stand ready to pay liberally. There is a greater field for development in North Carolina in all sections of the State in this line than in any other in horticulture. Not only the vegetables can be thus grown but fruits like the strawberry and the foreign grapes can be made a great source of profit under glass, for here we can get the fine Vinefera grapes ready for market a month before the California crop comes in, and can thus have the market to ourselves till the crop is sold. With sunny winters and a mild climate there is no reason why, with our rapid transportation

this winter forcing should not become a leading industry here. Our people have yet to learn the great value of a concentration of capital and effort on small areas. They want to be large farmers or large gardeners and go over a great area, which the investment of more capital on a smaller area and the use of glass would bring greater profit. But the business is starting and is certain to develop in the future as men of means realize the advantages we have.

TRUCKING IN THE MOUNTAIN COUNTRY.

One of the most recent developments in the State has been the production in the high plateau region of vegetable crops for the lower southern coast in the late fall and winter. The lower coast country from North Carolina to Southern Florida is now being supplied with winter cabbages and potatoes from our mountain country. Some years ago the writer was at a small town on the French Broad River west of Asheville. A buyer came there from Charleston, S. C., being told that he could buy potatoes there. He remarked that it did not look like there were any potatoes in those great hills. But he sent out word that he wanted them, and by night of the first day there were more potatoes there than he had money to pay for, and he was obliged to telegraph for funds. By the next evening he had all the potatoes he needed, and found that hills did not prevent the growing of the crop.

But the greatest development in this line has been in Henderson County. Here the great fall crop is cabbage, and though the business was started only a dozen years ago, they now ship train loads to Florida and other sections of the South where this late crop cannot be successfully produced. The climate of this mountain region closely resembles that of sections far north of them, and their nearness to the Southern market makes their product sell to advantage, because of greater cheapness of transportation. While the eastern section of the State can excel in the growing of early crops, the mountain country has the advantage of climate for the production of the general crop of Irish potatoes and cabbages, and the mountain crop of potatoes is then succeeded by the still later crop of Irish potatoes produced in the east as a second crop from the seed of the early one. In writing of the truck in the east we should have mentioned this late crop of potatoes. We were shown a field in Edgecombe County where a profitable crop of early potatoes had been grown, a crop of pea-vine hay raised and a crop of late potatoes, making 65 barrels per acre, was then dug and banked up in the field, and the land was then set in cabbages for the next spring. This crop of potatoes, amounting to 1,500 barrels, was sold before Christmas for $2.50 per barrel. This late crop is dug about the first of December in the east and piled in the field and covered with earth. Many growers let them remain till February, when they are taken from the earth and shipped North and sold as "New Bermudas."

The great value of this second crop, however, is for planting the early crop the following season. It has been found that these potatoes are far better than the Northern seed potatoes, and now the growers of the early crop will use no other seed for planting. They are out of the

TRUCKING—ATLANTIC & NORTH CAROLINA RAILROAD.

ground but a short time and never sprout as the Northern potatoes do which are dug early in the fall, and when they grow it is with the strong growth of the terminal bud instead of the lateral eyes of the Northern potato, and the crop is better by reason of a better growth and undiminished food supply in the potato. These late potatoes are begining to be valued in the North for seed, and a business will grow up in their production in which the South will have a monopoly.

SMALL FRUIT CULTURE.

As in the production of early crops of vegetables the Coast Plain has an advantage over other sections by reason of its mellow soil and mild climate, so in the production of the strawberry crop this section also has the advantage of earliness. The first strawberries usually come from Chadbourn in Columbus County, where a colony of enterprising people from the Northwestern States have settled and are making homes where blizzards never blow, having been driven by these from their home in the Northwest. Their soil suits the strawberry admirably and Chadbourn berries take the lead in the early market by reason of superior quality.

Following the Chadbourn berries come those from the neighborhood of Wilmington, and then on up the Wilmington and Weldon Railroad of the Coast Line System, station after station comes in till the bulk of the crop is reached in the neighborhood of Mount Olive. In the height of the season several train loads daily are sent North and the crop runs away up in the millions of baskets. The level black lands abounding in moisture are ideal lands for the strawberry which is very fond of water, and the liberal fertilization of the strawberry fields produces immense crops. This crop has been the great source of wealth all along this line of railroad and is increasing in extent and importance annually and extending northward so that there is a continuous production of the berries from Chadbourn till the crop is ready around Norfolk.

In addition to the strawberry crop, which is the largest, there are also a great many blackberries produced. The earliest of these is the running variety of dewberry known as the Lucretia, These are followed by the Wilson early blackberry and the early harvest. The Lucretia comes into market long before strawberries are ripe in the North and usually gives very profitable returns as also to the other varieties. The dewberry and blackberries are grown not only in the eastern section with the strawberries but are also grown in other parts of the State. They are becoming a profitable crop in the Sand Hill region, and along the Seaboard Air Line north of Raleigh and wherever grown they have been found profitable. Raspberries are but little grown in the eastern section, as they do not bear transportation well and the climate is not suited to them as well as that north of us, the summers being too long for them.

In the coast plain the production of grapes is largely confined to the scuppernong, though other grapes thrive and are grown to some extent. There are several large vineyards devoted to the making of wine. The Medoc vineyard of the Messrs. Garrett produces hundreds

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of thousands of gallons of wine annually and wine of a high quality and reputation, especially that from the scuppernong grape. Near Fayetteville the Tokay vineyard of Hon. J. Wharton Green has made a high reputation for its scuppernong wines and there are others in the same section. In the mountain country, where the scuppernong does not thrive, Col. Hoyt of Buncombe County has a successful vineyard, and is producing the French and other European grapes by grafting them on our native roots. His vineyard, known as Engadine, has also made a reputation for the quality of its wine.

But it is in the sand hill country in Moore County where the greatest development in grape-growing has developed. At Southern Pines many Northern invalids found that they could live in comfort on the dry soil and in the mild climate, and they made homes there. Naturally they wanted to grow something, and they soon found that the apparently barren sand had a wonderful capacity for the production of grapes of fine quality. The business grew until there are now about 1,000 acres in grapes, almost exclusively of Delaware and Niagara varieties around Southern Pines. No wine of any amount is made, since it pays better to ship the fruit, which goes to market in July and August. Finding how well the grape did these settlers experimented with other fruits, and now the growing of peaches bids fair to excel the grapes in extent and profit. Orchards of many hundreds of acres have been planted and have been profitable. The largest one, that of the J. Van Lindley Company, covering several hundred acres, and producing peaches of the finest quality. Pears of the Kieffer and Leconte type are also largely grown, and the vigor and productiveness of apples on these sandy soils is a surprise to those who have not seen them. Plums of the Japanese and native sorts, too, are being largely grown, and the sand hill region seems likely to gain a great reputation for fine fruits as it has for healthfulness. In this same region at the great winter resort, Pinehurst, which was founded by the late James Tufts, of Boston, who spent a million of dollars in its development, there is a prosperous nursery in which a specialty is made of native trees and plants for ornamental purposes. This nursery is gaining a reputation abroad and is proving a profitable enterprise.

It is not only in the sand hill country that the peach and grape thrive. All over the rolling uplands of the Piedmont country they are grown to perfection, as well as the plums and other fruits. In Guilford County, near the City of Greensboro, are the largest nurseries of fruit and ornamental trees in the State. The nurseries of the J. Van Lindley Company, at Pomona, cover hundreds of acres, and are doing a large business. In the same county, near Greensboro, are the nurseries of J. A. Young, where a successful business has been established. The nurseries of J. W. Anthony are also in Guilford County, south of Greensboro. From these nurseries, where all the trees of the climate are grown, our planters can be supplied with the best of stock and need not go to a distance to get what they want. Another nursery of importance is that connected with the great Biltmore estate near Asheville. This has been largely devoted to the production of trees and plants for the adornment of the estate, but also produces trees for sale.

There are smaller nurseries scattered over the various sections of the State and supplying a local demand.

ORCHARDING IN NORTH CAROLINA.

We have mentioned the peach, which thrives in all sections of the State. The leading orchard fruit is of course here as elsewhere the apple. While apples can be grown at least for home use in every section of the State the production of apples for commercial purposes is largely confined to the elevated region just east of the Blue Ridge and to the mountain country beyond the ridge. This wonderful region of valley and plateau and mountain sides is the finest apple region in the United States, but is as yet largely undeveloped. Apples are grown all through the mountain country, but little attention is paid to the trees and the fruit is handled in the most careless manner. But there are apples there every year, and when here and there the orchards get intelligent attention the product is of the finest. A few years ago the late Geo. E. Boggs of Haywood County exhibited apples in variety at a show in Madison Square Garden, New York, in competition with the whole country and carried off the first prize. When North Carolina apples can thus excel all the noted apple-producing sections of the United States the capacity of the State for this production is well worth looking into, and should attract capital. Mr. Cone, of New York, who has a branch house in North Carolina and has a fondness for the North Carolina mountains, has made a summer home on the Blue Ridge near Blowing Rock, and has invested largely in the preparation of the soil and planting of apples. His orchards now number many thousands of trees and will soon be coming into profit, and will doubtless be a fine source of revenue. When skilled fruit growers discover the great capacity of the mountain region for the apple crop, and its nearness to the Southern market there will be a great movement towards orchard planting in this beautiful Land of the Sky. The apples now sold in the cities and towns of the eastern section of the State as well as in all the States south of us come mainly from the North. The mountain region of North Carolina is capable of supplying the whole southern market with apples, and under a wise management would soon be doing so.

ORNAMENTAL GARDENING AND FLORICULTURE.

The crop of tuberose bulbs produced in a small section along the Atlantic Coast Line Railroad in the neighborhood of Magnolia, Rose Hill and Wallace, now numbers millions of bulbs annually and supplies the demand for these in the Northern cities and in foreign countries as well. The soil of this section is admirably adapted to the production of these bulbs, and attention is now being given to the growing of other plants of a similar nature. Caladiums are largely produced and meet a ready sale. Cannas, too, are grown in immense numbers and the gladiolus is being tested with success. Dahlias do well. The North Carolina Experiment Station has been for years experimenting with other bulbs which are largely used by the Northern

florists and are as yet imported from Europe and other countries. The principal bulb experimented with has been the Bermuda Lily, over a half million of dollars worth of which are annually imported from Bermuda. As the conditions needed by these bulbs are better understood it is believed that they will be profitably and successfully produced here, and it is thought that the eastern Coast Plain is the place for these as well as other bulbs.

When our gardeners get to using heated glass structures in the cultivation of winter crops of vegetables they will soon be looking into the uses that can be made of these houses at times when they would otherwise be vacant. The florists of the North have found that it is an advantage to have the roses they sell grown in the South. We have here a longer season for the growing of field roses, and a general freedom from the mildew that injures them in the North. A great and profitable division of labor can be made by the propagation of roses in the South. The cuttings can be taken from plants growing in the open ground and can be rooted in the houses during August and September before the winter forcing begins, and when established in small pots can be packed away for the winter in cold frames or then sold to the trade who may wish to grow them on to a larger size for spring or can be set in the open ground in the spring and grown during the summer for fall sales. A great business can thus be established anywhere in the State.

The rose is but one of the many things that are sold in large quantities North, and which can be more cheaply produced in the South. Even without the use of glass the hardy Hybrid Perpetual roses can be grown here by setting long cuttings in the open ground in December, cultivating them one season and then having them ready for shipment North. There are also numerous ornamental plants that can be propagated here in the same way which are tender in the North. A liberal investment of capital in this line with skilled men to handle the business would result in the establishment of great and profitable enterprises. The possibilities of floriculture in North Carolina are but little understood either in the State or beyond, and when they are more completely realized there will be a wonderful development in this line. This is especially true of the production of bulbs and roses, and in these alone there is an opening for investment that should attract lovers of the beautiful.

We have made but a hasty sketch of the great horticulture advantages of North Carolina. While there has been some development, as in the truck farming and the tube-rose growing sections, the great horticultural capacity of the State has hardly been realized much less developed. There are great possibilities merely waiting for the men and the means to develop them, and we have endeavored briefly to show just where the profit can be made in this development. For men skilled in horticultural operations and with capital to push the work, we know of no more inviting field. Climate, soil and transportation facilities combine to give us an advantage over sections north or south of us.

STRAWBERRY FARM—ATLANTIC COAST LINE.

ORCHARDS AND SMALL FRUIT.

GENERAL.—The cultivation of the orchard and small fruits is destined to become one of the most important agricultural features of the State. Already the cultivation of strawberries in the Coast Region has attained a high degree of development and the same section produces considerable quantities of blackberries, dewberries and scuppernong grapes. Pears, peaches and cherries thrive well in the various regions of the Piedmont, while in the mountains and foothills, apples and the cluster grapes grow luxuriantly. There seems to be no section of the State that is not well adapted to the cultivation of some one or more of these fruits. In this brief discussion we are only able to indicate the principal regions adapted to the fruits considered, and to mention the efforts being put forth to encourage the industry.

Transportation Facilities.—The question of transportation is of prime importance to every fruit grower. The eastern region is traversed by the main line of the Atlantic Coast Line Railway, and its numerous branches. The eastern Piedmont and the western portion of the Coast Region are crossed by the main line of the Seaboard Air Line Railway, while the main line of the Southern Railway traverses the State in the middle of the Piedmont Belt. The mountain sections are reached by branches of the Southern and one or two minor roads. The principal roads mentioned give quick transportation to the large markets of Washington, Baltimore, Philadelphia, New York and Boston.

ORCHARD FRUITS.

Apples.—The principal centers of apple production are in the western part of the State. The list as here given is adopted for convenience in finding the places on the map, and does not pretend to indicate the comparative adaptability of the localities: Mt. Airy, (Surry County); Wilkesboro, (Wilkes County); Blowing Rock, (Watauga County); Burnsville, (Yancey County); Asheville, (Buncombe County); Hendersonville, (Henderson County), and Waynesville, (Haywood County).

Varieties which have proven popular with the growers of western New York seem to do well here, as: York Imperial, Winesap, Ben Davis, Spy, Baldwin, Fallawater, and, in choice localities the famous Albemarle Pippin grows to perfection.

Cherries.—Although the cherry is not much grown for commercial purposes in the State there are certain localities that are well adapted to it. The Upper Piedmont, including the counties of Guilford, Forsyth, Stokes and Yadkin, yielded an exceptionally heavy crop last year (1901).

Peaches.—With proper care this is a profitable fruit in all except the highest, coldest and most exposed mountain localities. Profitable orchards are to be found from Carteret County in the east to Haywood in the west. The principal centers, however, are at Greensboro, (Guilford County), in the Piedmont, and Southern Pines, (Moore County), in the sandhill region.

Pears.—The pear is cultivated over the entire State but mostly eastward from the mountains. In the east the principal centers seem to be Edenton, (Chowan County), and Fayetteville, (Cumberland County), while in the Piedmont, Guilford, Forsyth, Yadkin and Davidson Counties seem well suited to the production of this fruit.

Plums—The area of cultivation of the plum is practically identical with that of the peach except that it is not so much cultivated in the mountains.

SMALL FRUITS.

Blackberries and Dewberries—Cultivation confined mostly to the east-central portion. Warren, Moore, and Cumberland Counties represent the more important sections.

Grapes, Scuppernong—Cultivated mainly in the east, where it is indigenous, and is much in favor. Halifax, Warren and Pitt seem well adapted to it, and no doubt the adjoining counties are equally well suited.

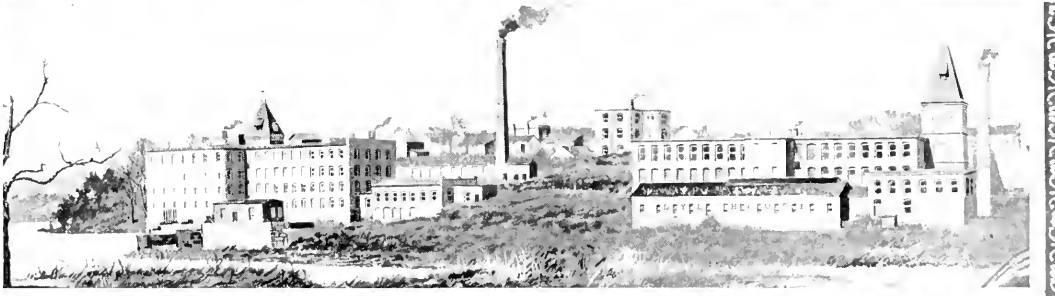
Grapes, Cluster—Mostly cultivated in the west, though one of the largest centers is Southern Pines (Moore County) in the Sand Hill region. In the western portion, centers of production are Tryon (Polk County); Asheville (Buncombe County); and Waynesville (Haywood County).

Strawberries—Eastern region, mostly along Coast Line Railroad from Weldon (Halifax County) to Wilmington (New Hanover County), especially southward from Goldsboro (Wayne County). Also grown in great quantities around Ridgeway (Warren County); Kittrell (Vance County); Newbern (Craven County); and Chadbourne (Columbus County).

The strawberry industry is more fully developed than any other branch of fruit growing in this State. Thousands of hands are employed in this industry, and tens of thousands of crates of berries are shipped northward. This great industry has sprung up quickly and is still comparatively new to our State.

Nurseries in North Carolina—There are 45 nurseries in the State which keep an abundance of stock to supply the demands of the growers. The nurseries of the State are inspected every year by an authorized officer to see that the salable stock is not diseased or affected with destructive insects. In this way a fair degree of protection is afforded the customer who deals with our nurseries and growers are urged to patronize them rather than order from a distance. A list of the licensed nurserymen for 1901–1902, will be found in the October, 1901, "Bulletin" of the North Carolina Department of Agriculture, (Raleigh, N. C.) which will be sent upon application.

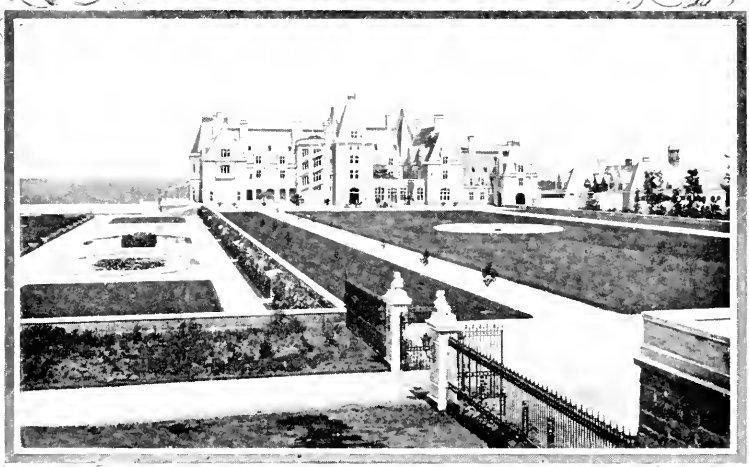
Insect Pests, etc.—The Crop Pest Commission which is furnished with a small fund from the State, works in co-operation with the State Department of Agriculture in controlling the work of nursery inspection, and their proper officers give free information to all enquirers regarding the various pests that attack fruit or other crops.



SOME COTTON MILLS.

ROANOKE RAPIDS, WELDON. VICTOR, CHARLOTTE.

T. M. HOLT, HAW RIVER.



THE VANDERBILT ESTATE—DRIVEWAY—MANSION—BILTMORE STATION.

MANUFACTURING.

ALTHOUGH in the past almost entirely an agricultural State, North Carolina is rapidly developing into a manufacturing State also. In 1850 there were in the whole State only 14,601 persons engaged in mechanical industries of all sorts; in 1900 there were 70,570, an increase of 383.3 per cent. In the last decade the number of establishments increased 97.1 per cent.; the capital invested increased 133.6 per cent.; the average number of wage-earners 109.9 per cent.; the cost of material used 132.9 per cent.; the value of products 135.00. The value of manufactured products increased in the last ten years from $40,375,450 to $94,919,663.

FACILITIES AND OPPORTUNITIES FOR MANUFACTURING.

Few States offer more favorable opportunities for profits in manufacturing. The climate is mild, hence smaller quantities of fuel are needed; in most parts of the State water-power is abundant; there is a great variety of raw products; labor is wonderfully tractable and intelligent enough to adapt itself to the needs of the hour.

LEADING INDUSTRIES.

The ten leading industries ranked according to the value of their output are as follows:

Cotton goods	$28,372,798
Lumber and timber products	14,862,593
Tobacco (manufactured)	13,620,816
Flouring and grist mill products	8,867,462
Lumber products, sash, doors, blinds, etc.	2,892,058
Oil, cotton seed and coke	2,676,871
Furniture	1,547,305
Car and ship construction and repairs by railroads, etc.	1,511,376
Leather	1,502,378
Fertilizers.	1,497,625

COTTON MILLS.

No other industry in the State has had so rapid and so healthy a growth as the cotton mill industry. "The period both of greatest absolute increase and of the greatest percentage of increase in the value of products was during the decade ending with 1900. In 1890 North Carolina was tenth in rank in this manufacture in the United States; it is now third, Massachusetts being first and South Carolina second. In 1890 among Southern States it ranked third; it is now second, South Carolina preceding it, and Georgia taking third place. Although second in value of products, it is first in number of establishments, in average number of employees, and in total wages paid. The amount of cotton consumed yearly by the spindles now running is nearly

equivalent to the annual cotton crop of the State, which in 1899 was 473,155 commercial bales."

This growth is at a rapid rate but is none the less healthy, for the mill stocks of this State stand fully as high in the estimation of investors as those of any other State and the industry in North Carolina has suffered as little, or perhaps less, than that of any other State in the periodical waves of depression that influence cotton manufacturing all the world over.

Among the difficulties of, and the drawbacks to, manufacturing in the Old World and even in the Eastern States of the Union, is the one of transit of raw material and finished product. For a hundred years the spindles of the world have depended almost entirely on America for their supply of cotton, and now, notwithstanding the large crops raised in Egypt, India, China and South America, probably two-thirds of the spindles in existence use cotton that is grown in the South. These mills have to bear heavy freight charges, both on the raw cotton and again on the reshipment of manufactured goods; goods which still to a large extent are re-imported into this country. Again the older manufacturing countries have to deal with labor that is organized in trades unions, which insist on high wages, short hours, with laws that have been passed incurring all kinds of restrictions and regulations which, however desirable they may be from a philanthropic or politico-economical standpoint, are none the less galling to the average business man. In addition, the older established mills have often to contend with worn out and antiquated plant and machinery.

The business men of North Carolina were among the first to see the opportunities of a new era of cotton manufacturing; how, by adopting the latest and most improved machinery and by placing it in modern mills designed for economical working, they could utilize the willing labor in their midst and the cotton around their doors, thus keeping the money representing the cost of manufacture at home. The difference in value of the average sized crop of North Carolina cotton if sold as manufactured fabrics at about 15 cents, instead of 7 cents in the bale, would amount to $16,000,000 per annum, a larger portion of which sum would remain in the State.

The advantages of North Carolina as a manufacturing section and the reasons that have made it so successful are thus obvious. Raw material at the mill door, a regular supply of cotton of even grade and staple, absence of obnoxious State restrictions and grandmotherly legislation on factory questions, plentiful supply of wood for fuel or proximity to water powers, and an abundance of cheap labor, have all had their influence.

Perhaps the most potent reason has been the labor; all through the State there seems to be an abundant supply of teachable and tractable help, especially in the foot-hills of the mountains. They make, with some little instruction, exceedingly satisfactory mill operatives, their only fault being a spirit of unrest, a desire to move about from mill to mill, rather than settle in one place. The opportunity of mill work is usually valuable to these people in consequence of their lack

of elementary education and consequent unsuitability for many industrial occupations. In the cotton mills, however, this lack of education is far from being a drawback and as before stated they are found to be excellent help. Another feature of the cotton mill industry in this State is the number of small mills. Usually this is considered a disadvantage as the modern tendency is to increase the size of the mill to reduce the cost per pound of finished product. In North Carolina the small factory is a useful institution, as small communities that otherwise could not have a mill at all can often afford a small one; many small water-powers can be developed and utilized, and the small mill offers facilities for close supervision and for working up local supplies of cotton while the financial results often bear comparison with those of larger concerns.

The future possibilities of cotton manufacturing in the State are great. The motive power applied is either water or steam. Of the former the aggregate is about 3,500,000 horse-powers. Professor Kerr said that "if the whole of this were employed in manufacturing it would be adequate to turn 140,000,000 spindles. The water-power of North Carolina would manufacture three times the entire crop of the country, whereas all the mills on the continent only spin one-quarter of it. Putting the crop of the State at 400,000 bales, she has power to manufacture fifty times that quantity."

The choice between water-power and steam is determined by the comparative economy in the use of either the one or the other. In many cases there will be no hesitation in the adoption of the first, for natural conditions at once emphasize the decision. At the falls of the Roanoke, of the Tar River, on the rapid declivities of Haw and Deep Rivers, on never-failing streams in Cumberland and Richmond Counties, on the enormous forces of the two Catawbas, and perhaps elsewhere, a second thought would never be given to the application of any other power than that so exhaustlessly provided by nature and so easily and economically controlled. Elsewhere steam offers itself as the ready and convenient agent in such convenient form that the location of a new factory is rather made subservient to the convenience of transportation than to the character of the power to be applied; and thus it is that cotton factories are found everywhere in operation in the State, on the flat lands and by the sluggish waters of the eastern section, along the bold streams and the abundant water-falls in the middle section, or on the more turbulent torrents of the Mountain Region.

As shown, there is practically no limit to the power available for mill purposes and there is no limit to the cotton available, as when the mills reach the point when they exhaust the supply available from the State, cotton will be shipped from the States less favorably situated for manufacturing, and as New England can employ 14,000,000 spindles, the Continent of Europe 27,000,000 and England 45,000,000, there is no reason why the mills in the South should not continue to multiply for many years to come.

The products are varied and comprise yarns from the coarse carpet warp to the skein yarns for lace curtains, while the weaving mills,

in addition to sheetings, shirtings and drills, make ginghams, plaids, chambrays, stripes, cheviots, calico cloth, towels, etc. There are also several mills engaged in making cotton ropes, cordage and webbing as well as a number of cotton knitting mills, both for socks and underwear.

The large increase of cotton mills has been the means of introducing other industries, such as a card clothing factory, belting factories, reed and harness works, roll covering shops, machinery repair shops and many establishments for the manufacture of mill accessories, all adding to the prosperity of the State.

The capital invested in cotton mills in North Carolina is, according to the census report for 1900, $33,011,516, and the annual output sells for $28,372,798. The average number of hands employed is 30,273; these hands earn annually $5,127,087 for the day work alone.

The number of mills reported in 1901 is as follows: Cotton mills 225, running 1,680,483 spindles and 36,052 looms; woollen mills 11; knitting mills, 46; silk mills, 3; carpet mills, 1. The number of wage earners employed in all these mills is 44,544.

COTTON BY-PRODUCTS.

One of the new industries is the crushing of cotton seed. Only a few years ago, cotton seed was not thought of as a marketable product. In 1900, there were in the United States three hundred and fifty-seven establishments for working up seed, and the annual output was reported as worth $42,411,835. Of these establishments 20 are in North Carolina, and the annual output of these twenty is valued at $2,676,871. It is now the sixth industry in importance in the State. The increase in the value of this product during the past decade was $2,147,125 or 405.3 per cent.

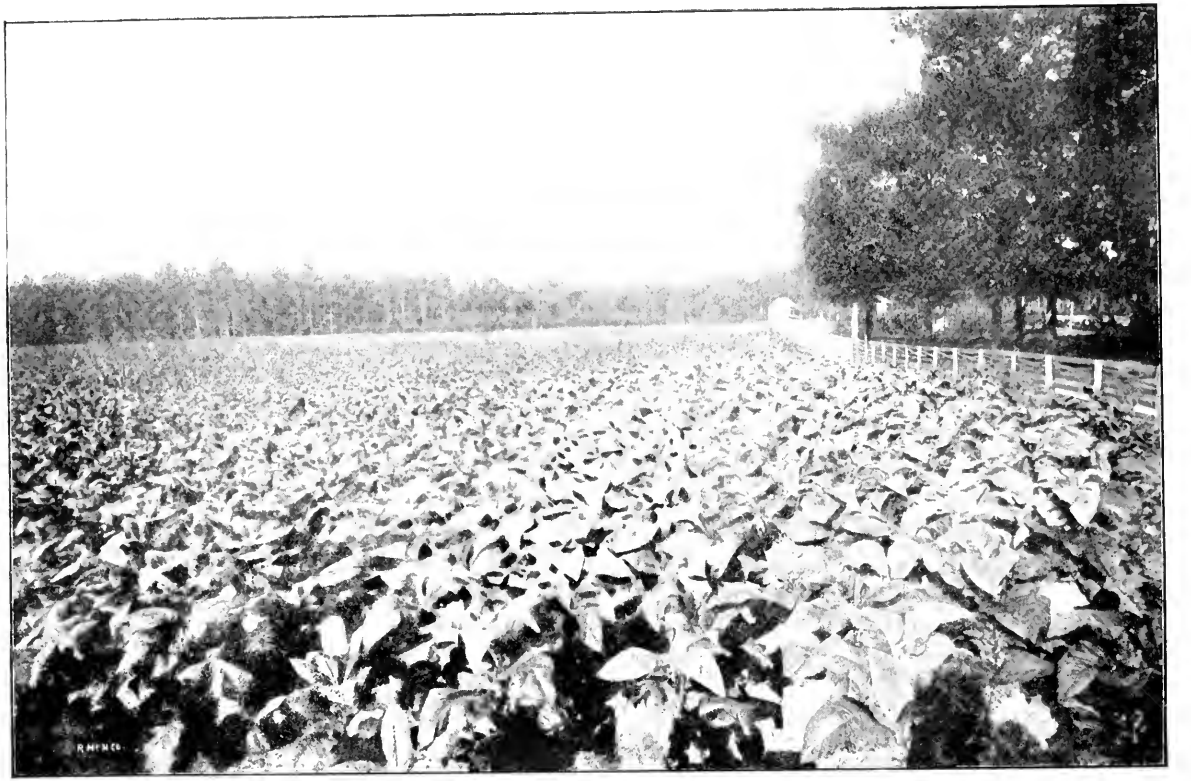
The physical constitution of a ton of seed as it comes from the gin is as follows:

Short lint	75 pounds.
Hull	915 "
Oil	300 "
Meal	610 "

The short lint has a limited sale for use in batting and wadding. The hull is now extensively used as stock feed—it was formerly used as fuel at the mills. The oil is used to make lard, soap, candles, table or "olive" oil, to pack sardines, as a lubricant and for illumination in mines, etc. The meal is used as a stock food and largely in the manufacture of fertilizers. The hull and meal mixed in proper proportions, make a very nearly complete food for the fattening of beef cattle.

LUMBER AND TIMBER PRODUCTS.

The manufacture of lumber and timber products (not including furniture factories, etc.,) ranks second among the industries of the State. There were in 1900, 1,170 establishments, 11,751 wage-earners, and products valued at $14,862,593. The increase in the value of these products since 1890 was $8,963,851, or 152 per cent.



TOBACCO FIELD—SEABOARD AIR LINE.

TOBACCO MANUFACTURING.

The table above shows that the third industry in remunerative value is tobacco manufacturing. Durham, Winston-Salem, Reidsville, Henderson, Wilson, Mount Airy, Statesville and Oxford, are the chief tobacco towns. The three first mentioned do most of the manufacturing. The largest fortunes in the State have been derived from this industry. Some of the brands manufactured here are noted the world over.

Including the chewing, smoking, snuff, cigar, cigarette, stemming, and re-handing industries, the Census for 1900 reports one hundred and one establishments. State reports make the number one hundred and seventy-seven. The number of wage-earners is 7,032, and annual value of product $14,609,760. The increase in value in the product during the last decade was $8,837,332.

FURNITURE FACTORIES.

The greatest industrial development in the last decade has been in the rapid increase of furniture factories. In 1890, there were only *six* establishments in the State, only 152 wage-earners, and the annual product was valued at only $159,000. In 1900 the six establishments had increased to forty-four, the 152 wage-earners had risen to 1,759, and the value of the product had changed from $159,000 to $1,388,305 or 873.1 per cent.

The little town of High Point is the pioneer and chief seat of this industry. During this decade the population of this town has increased about four-fold.

So plentifully is the State supplied with the best varieties of hard woods that any other town, with the same pluck, could develop as rapidly into a rich industrial center.

LEATHER WORKING.

This industry has grown apace in recent years. In the tanning, currying and finishing of leather the number of establishments has inincreased from 55 to 75 in the past ten years; the number of wage-earners from 107 to 366, and the value of product from $190,887 to $1,311,491, or 687.1 per cent. The ever-increasing use of machinery has of course, made the value of the output increase out of proportion to the increase in number of wage-earners.

CHIEF MANUFACTURING CITIES AND TOWNS.

The census returns for 1900 give the following fifteen cities and towns as leading the other towns and cities in the State in the value of manufactured products. They are named in the order of their financial output.

Durham, population 6,679; chief industry, tobacco manufacturing; number of manufacturing establishments, 82; capital invested, $1,727,205; average wage earners 2,787; total wages, $535,289; value of manufactured output, $7,084,540.

Winston, population 10,008; chief industry, tobacco manufacturing;

number of manufacturing establishments, 46; capital invested in these, $4,800,421; average wage earners, 3,420; total wages, $461,214; value of manufactured output, $5,436,030.

Charlotte, population 18,091; chief industries, cotton milling and distribution of cotton mill machinery; number of manufacturing establishments, 112; capital invested, $4,102,342; wage earners in these, 2,988; total wages, $699,846; value of manufactured output, $4,702,301.

Wilmington, population 20,976; number of establishments, 124; capital invested in these, $1,819,333; average wage earners, 1,469; total wages, 446,413; value of manufactured output, $2,246,237.

Raleigh, capital, population 13,643; chief industry, cotton milling; number of manufacturing establishments, 135; capital invested in these, $1,611,089; average wage earners, 1,358; total wages, $441,038; value of manufactured output, $2,204,056.

Salem, population 3,642; chief industry, mills and tobacco manufacturing; number of manufacturing establishments, 34; capital invested, $1,375,661; wage earners, 1,506; total wages, $270,027; value of manufactured output, $2,067,240.

Concord, population 7,910; chief industry, cotton milling; number of manufacturing establishments, 32; capital invested in these, $2,040,351; wage earners, 1,953; total wages, $410,215; value of manufactured output, $1,981,411.

Asheville, population 14,694; number of manufacturing establishments, 136; capital invested in these, $1,413,523; wage earners, 1,149; total wages, $357,411; value of manufactured products, $1,904,109.

Greensboro, population 10,035; number of manufacturing establishments, 79; capital invested in these, $1,711,629; wage earners, 1,587; total wages to these, $152,048.00; value of manufactured products, $1,790,523.

Newbern, population 9,090; number of manufacturing establishments, 81; capital invested in these, $1,027,885; wage earners, 1,162; total wages to these, $284.952; value of manufactured products, $1,704,251.

Reidsville, population 3,262; chief industry, tobacco manufacturing; number of manufacturing establishments, 37; capital invested in these, $851,705; wage earners, 888; total wages to these, $169,545; value of manufactured products, $1,234,783.

High Point, population 4,163; chief industry, furniture-making; number of manufacturing establishments, 47; capital invested in these, $834,673; wage earners, 1,116; total wages, $205,009; value of manufactured products, $1,178,715.

Goldsboro, population 5,877; number of manufacturing establishments, 46; capital invested in these, $620,932; wage earners, 507; total wages, $123,899; value of manufactured products, $1,086,834.

Salisbury, population 6,277; number of manufacturing establishments, 42; capital invested in these, $885,275; wage earners, 793; total wages, $163,401; value of manufactured products, $915,254.

Fayetteville, population 4,670; chief industry, milling; number of manufacturing establishments, 46; capital invested in these, $446,970; wage earners, 461; total wages, $81,424; value of manufactured products, $570,127.

COMMERCIAL FISHERIES.

THE fishing industry of North Carolina ranks as one of the most important business enterprises of the State, and in the coastal regions is no doubt of greater value than any other single branch of trade. There are few States having so large a population so entirely dependent on the fisheries for a livelihood, the total number of the employees of the industry being over 12,000, and there are few sections in which the general facilities for prosecuting the industry are more favorable. The fisheries, therefore, possess a great economic interest to the State, and indirectly to the country at large; and a proper knowledge of the extent, conditions and needs of the industry becomes a matter of considerable importance to the citizens of the Commonwealth.

The coast of North Carolina, following the outer shores, is only about three hundred miles long, but if the sounds, estuaries and other indentations are considered, a coast-line nearly one thousand five hundred miles in length is disclosed, along the entire extent of which the prosecution of commercial fishing is made possible by the configuration of the shores and the adjoining bottom, the absence of high or rocky shores, and the preponderance of low, sandy stretches and shallow water areas, permitting the employment of pound nets, seines, and gill nets under the most favorable circumstances.

The characteristic physical features of the coastal regions of North Carolina are the low, narrow, sandy islands and peninsulas which skirt nearly the whole ocean front of the State, between which and the mainland are numerous sounds, some of large size, which are the principal fishing grounds, while the mainland is very irregular in outline, and is intersected by a number of large and small streams.

The principal fishing grounds are the sounds and lower courses of the streams emptying into them. Fishing in the upper courses of the rivers is usually of a non-commercial nature, and is unimportant.

The sounds of North Carolina are Currituck, Albemarle, Croatan, Roanoke, Pamlico, Core and Bogue, each of which deserves brief notice.

Currituck Sound is the most northern sound in the State. It runs parallel with the coast, and extends from the Virginia State-line to the eastern end of Albemarle Sound, with which it merges. It is forty miles in length, and from three to four miles in width. For a body of water of such size the depth is extremely shallow, in no place being more than nine feet. Except during periods of dry weather the water is fresh, although at one time it communicated freely with the ocean by means of Caffey Inlet, which was closed in the year 1800. Prior to this time the sound contained marine fish, but at present only fresh water and anadromous fishes are found in it. Black bass (locally called chub) and white perch are very abundant, and at the proper season rock and herring enter the sound in considerable numbers. The catch of black bass is probably greater than in any other part of the State, if not the largest in the country. The region is annually vis-

ited by enormous numbers of wild fowl, and is one of the most noted hunting resorts on the Atlantic coast.

Albemarle Sound and tributaries are next in order. This sound has the distinction of being the largest coastal body of fresh water in the world. Its extreme length from east to west is sixty miles, and its maximum width is fifteen miles, the average being six to eight miles, it therefore contains about four hundred and fifty square miles. The water is normally quite fresh, but during periods of excessively dry weather it becomes salt or brackish, especially at its eastern end, where it drains into Roanoke and Croatan Sounds.

Of all the North Carolina sounds this is the most important from a fishery standpoint, and it is probable that there are few bodies of water of similar size in the world having more extensive fisheries. It is especially remarkable for its level bottom and uniform depth of water, and the absence of strong currents and tides, except those of infrequent occurrence resulting from gales. The importance is due to the fact that the region is annually visited by enormous bodies of shad, ale-wives, striped bass and other desirable economic species, and the natural conditions permit the employment of seines, pound nets, gill nets and other devices in almost limitless numbers.

Eight rivers enter the sound, four on the north, two on the west, and two on the south, in nearly all of which more or less extensive fisheries are carried on. The Chowan and Roanoke Rivers, which flow into the western end of the sound, are among the largest and most important in the State, and have large fisheries in the portion adjacent to their mouths. The North, Pasquotank, Little and Perquimans Rivers on the north, and the Scuppernong and Alligator Rivers on the south, are short, wide streams, the most important as regards fisheries being the Pasquotank and Alligator.

Roanoke and Croatan Sounds lie to the south of the eastern end of Albemarle Sound, and extend parallel with the coast; they are separated by Roanoke Island. Roanoke Sound lies to the east of the island, and is eight miles long and one and one-half to two miles wide. It is very shallow throughout its length, exeept in a narrow channel which skirts the shore of the island. Croatan Sound has the same length as Roanoke Sound, but is two to four miles wide and is much deeper. Most of the drainage from Albemarle sound passes through it. The combined area of these bodies of water is seventy-five miles. Important gill net and other fisheries are prosecuted in these sounds.

Pamlico Sound and tributaries are of commanding importance. With the exception of Long Island Sound, this is the largest sound on the Atlantic coast of the United States. It is about seventy-five miles long, and from ten to thirty miles wide, the area being about one thousand eight hundred and sixty square miles. On the north it communicates with Albemarle Sound, through Roanoke and Croatan Sounds, and much of the water of Albemarle Sound finds entrance into the ocean through it; on the south it joins Core Sound. The general depth is fifteen to twenty feet. The sound is separated from the ocean by long, narrow strips of sandy land called "Banks," through which

the water of the sound finds exit at New, Hatteras and Ocracoke Inlets. The land known as the "Banks," consist chiefly of low, barren sand hills, with occasional patches of scrubby vegetation. Two important rivers, the Pamlico and Neuse, enter the sound from the west, their mouths being broad estuaries in which considerable fishing is done. Pamlico Sound contains a great wealth of both fresh-water and salt-water fish. The large bodies of anadromous fish which occur in the sounds to the north all pass through it. The salinity of the water permits the entrance of menhaden, squeteague, spots, mullet, sheepshead, whiting, hogfish, bluefish, etc., in large numbers. Large areas are covered with a natural growth of oysters, a product which has recently attained marked prominence.

Core and Bogue Sounds, communicating with Pamlico Sound on the north, and extending first in a southwesterly and then in a westerly direction, form a long and narrow body of water about fifty miles in length, and from one to six miles in width. Their area is about one hundred and sixty-five square miles. These communicate with the ocean through Beaufort, Bear and Bogue Inlets. The water is very shoal, varying from one to ten feet, and not averaging more than four or five. The people living on the shore of these sounds are very generally dependent on the water for a livelihood, and the fisheries carried on are very extensive. The principal species taken are mullet, squeteague, bluefish, spots, hogfish, Spanish mackerel and whiting. The catch of the two first-named fish is larger than in any other body of water on the Atlantic Coast.

Other Sounds.—South of Bogue Sound the coast is fringed with five small shallow sounds, known as Stump, Topsail, Middle, Masonboro and Myrtle Sounds. These have but little bearing on the fisheries at present, and are chiefly important because of the possibilities they have for oyster production and cultivation. White Oak and New Rivers, the only streams of importance between Beaufort entrance and the Cape Fear River, also have natural oyster beds. New River, in the opinion of Lieut. Winslow and many others, contains some of the finest oyster ground in the world, although the absence of shipping facilities until a very recent date has delayed the development of this important resource.

Fishing in the ocean is prosecuted with gill-nets and seines at many places along the coast, but is especially important on the shore between Cape Hatteras and Currituck Sound, where the winter fishery for bluefish has become famous. The species taken in greatest numbers, are, in addition to bluefish, trout, spot, mullet, drum, whiting, Spanish mackerel and sheepshead.

In the vicinity of Wilmington, considerable line fishing is done at times on the blackfish banks located several miles off shore, sea bass, grunts and pigfish being the species taken.

The outside fisheries in the vicinity of Beaufort and Morehead are also of great importance. Mullet, bluefish, Spanish mackerel and the sea trouts (weakfish) are the species chiefly caught in large quantities, and these, together with the miscellaneous and smaller bunch fishes, are shipped fresh almost entirely. Quite a number of mullets, however, are salted down and disposed of in that shape.

The great fish shipping centers of the State are Currituck, Elizabeth City, Edenton, Manteo, Washington, Morehead, Beaufort, New-Bern and Wilmington.

The relative importance of the different kinds of fishing and of the species taken, varies somewhat from year to year, but the following list will give a fairly accurate idea of the subject:

Shad.—This fish is caught chiefly in the Albemarle Sound and around Roanoke Island and in the adjacent waters. It is disposed of entirely in a fresh condition, and is the best money fish in the regions where caught. The total catch in this State approaches half a million dollars in value.

Next in importance among the water products is the oyster, the annual production of which is not less than a million bushels, with a value of over two hundred and fifty thousand dollars. Some oysters are shipped in the shell, but the greater part of the fresh stock are shucked and shipped in bulk; that is in five or ten gallon lots. A large proportion of the catch is canned.

The herring or alewife is third in importance, and in this case the greater bulk of the catch is salted and disposed of in the cured state, chiefly locally. Possibly a third of the total output is shipped fresh.

Mullet is the next on the list and here we find a production of over a hundred thousand dollars. About twenty per cent. of the catch is salted and barreled while the remaining eighty per. cent. is iced and shipped in the fresh state.

The salt water trout, or weakfish, is of about equal value with the mullet and possibly their relative position should be reversed. Only a small proportion is disposed of in other than a fresh condition, the great bulk being iced and boxed in the usual way.

Striped bass, chiefly a product of the Albemarle region, is not salted at all, its value in the fresh state being too great to admit of anything beyond the proper careful icing and packing for shipment for immediate consumption or for cold storage.

Clams come seventh, with an annual production of about a million pounds valued at more than fifty thousand dollars.

The bluefish, a product of the salt water almost entirely, is next in order and here again the bulk of the catch goes forward on ice although some fifteen or twenty per cent. are salted, chiefly for local consumption.

The fresh water perch follow the above in order of importance and they are consumed entirely in the fresh state. They command good prices locally as "pan" fish, apart from their value as shipping stock. Production, nearly a million pounds.

The same conditions prevail regarding black bass, the catch for the State coming mostly from the fresh waters of Currituck Sound. The catch of these amounts to over half a million pounds per annum, with a value of twenty-five thousand dollars.

Last of the eleven most important fishes comes the menhaden, or fatback, caught entirely for the oil and the fish scrap resulting from the extraction of the oil. The catch of this fish with us runs up to some ten or fifteen million pounds annually with a value of over fifty thousand dollars for the product manufactured therefrom.

The total annual value of our fishery products now amounts to over a million and a half dollars and is steadily increasing.

Oysters, etc.—In the saline waters of North Carolina abound oysters, clams, scallops, crabs, shrimp, and diamond-back terrapin. In commercial importance the oyster is of far greater value than all the others combined, and will be treated accordingly in what follows.

The abundance in which oysters were found along the Atlantic coast of the United States, and their superior excellence, made them at once, upon the settlement of the country along the waters which provided them, an article both of subsistence and luxury. With the increase of interior population and the provision of quick and ready means of transportation, the use of them was enormously enlarged, and the distribution of them, in all the forms of use, became co-extensive with the American continent, and was not confined to that broad area, for Europe, in the diminution of its own supplies, and also in its recognition of the superiority of the American oyster, has been for a number of years a large consumer. The consequence is the depletion of many grounds once regarded as inexhaustible, the diminution in other waters where diminution seemed impossible, followed by the assertion of local rights, attempts at the exclusion of invading trespassers, contention, bloodshed; finally legislative action and the effort to define rights by law, with power to assert and secure them by force; and all this made necessary because human nature knows no moderation in the use of the abundant free gifts of Providence, or in the attainment of that which leads to competency or wealth.

It happens that there remains one treasure-house not yet plundered, one great water granary whose doors are not yet thrown wide open. North Carolina, overlooked and despised in the Eldorado of the Chesapeake, now, when the glories of the latter are fading, is found to possess what. with prudence, patience, legislative wisdom and local self-control, may be converted into a field quite as prolific as the once teeming oyster waters of Maryland and Virginia. Its sounds, its bays and its creeks, extending along the coast for hundreds of miles, give promise of natural conditions that will assure in time as large a product as ever existed in other waters. Some of these North Carolina waters are too much freshened by the influx of fresh water rivers to have been the habitat of the native oyster, or to be made available as beds for artificial culture; but in all the other waters which exist in the largest proportion, to which the salt waters of the ocean have ready access, the native oyster has always been found, and of great excellence. In the depletion of the oyster grounds of the Chesapeake and other waters, the enterprise of the oystermen of those localities was on the alert to save their industries from ruin, and the invasion of the North Carolina waters was rewarded with the discovery of a large relatively untried area. To check what threatened to effect here what had been done elsewhere, and to secure the people of North Carolina in the possession of their rights, the aid of legislation was earnestly invoked.

The natural beds have now been defined and located, and under recent laws much additional area adjacent to them has been set apart and excepted from entry. These areas are the public grounds, and by

law they include the natural beds and sufficient area adjacent and surrounding them to provide for their natural expansion. The provision for allowance for natural expansion has been liberally construed, as will be seen by the following summary of the areas of the natural beds and public grounds:

County.	Area Public Grounds.	Area Natural Beds.
Dare . . .	4,604.16	2,118.25
Hyde . . .	6,891.94	1,642.90
Pamlico . . .	4,495.61	437.00
Carteret . .	4,561.40	1,012.50
Total . ,	20,553.11	5,210.65

Or the area of the public grounds exceeds that of the natural beds by 15,343 acres. The natural beds of that portion of the State not under the operation of the new law comprise 3,381 acres, or the total acreage of natural beds is 8,591.

The area reserved for the common fishery is thus ample for all time to come, and as these areas are excepted from entry, and as they include the natural beds, not only is an entry or appropriation of a natural bed prevented, but no person can, practically, enter near a natural bed. At the same time, as the grounds open to the general fishery are defined and known, the private cultivator is free from depredation under guise of the exercise of the common right of fishery. Thus the source of complaint of all classes interested is removed,

The oysters taken at the different points in the sounds and estuaries vary much in size, shape and flavor. The New River oysters are much prized for size and flavor, and are probably the best known abroad. But the markets of Wilmington. New Bern, Washington and other points are supplied from their various oyster grounds with a shellfish of a quality not inferior to those taken at New River. With the care in cultivation, and the protection given by law, it is only a question of time when the waters of North Carolina will yield as abundantly as the waters of the Chesapeake have done, and, in quality of the oyster, with no inferiority.

The diamond back terrapin is found in all the coast country, a delicacy in such demand and of such value as to have become the subject of legislative protection and of artificial cultivation.

Clams abound, and are now recognized as valuable members of the class of mollusks. They are shipped in large quantities from New Bern, Morehead City and many other points.

The same may be said of scallops, soft-shell crabs and shrimp. These delicacies are abundant and find ready sale both in local and distant markets.

PUBLIC ROADS.

PUBLIC roads should mean good roads, and this will be a fact when the communities at large realize that good roads are cheaper in the end than poor ones. Our roads are of the first importance in keeping communication open between the people of the town and those of the country, and the intercourse between these two peoples will be governed by the condition of the roads; but the worse roads will always react to the greater disadvantage of the people of the county. Widely separated localities are brought into close communication with each other, and instead of only meeting with one another on court days, there will be almost constant intercourse, and there will be developed among the people a more liberal public spirit; a clearer understanding of the needs of town, county and State, where before he has allowed himself to be satisfied with his farm and the small section of country lying between it and town, and a higher appreciation of his neighbor. Good results will also be obtained for the town, inasmuch as good roads will attract the people of our cities and towns out into the surrounding country, where they will meet and know the farmer on his own ground, instead of always on theirs. They will learn to appreciate the worth of a rural community and to accept the criticisms of its citizens on the affairs of State as valuable and founded upon deep thinking and practical experience, for they will find many times that the farmer is the best equipped and all-round man in the State. He, the farmer, will become more so as he has better opportunity for intercourse with his neighbors of country and town.

Bad roads are a heavy tax to all who have to use them, not only on account of the breakage to wagons and the wearing out of stock, but also to the loss of time and extra expense in the hauling of produce to and from town. To illustrate, on a good road one horse can haul four bales of cotton, while on a poor road one bale to a horse is the limit and sometimes it take two horses to one bale. In other words it costs at least four times as much to haul a bale of cotton over a poor road as over a good one. It also prevents the farmer from taking advantage of any sudden advance in the price of the commodity that he has to market. Then again, bad roads effectually shut out business men of our cities from making their homes in the country as it would be a too long and tedious journey to and fro. While the actual productive value of two farms may be identical, yet the one on a good, smooth road will be worth a great deal more than the other, for the actual net earnings of the farm on the good road will be largely in excess of the other.

Good roads mean better educational facilities in our rural districts, for there will not be necessary so many school districts and so much division of the school fund. The districts can be more consolidated, thus permitting of larger and better schools, which can be graded, and thus insure better teaching and more enthusiasm on the part of both pupil and teacher.

Good public roads also mean more extensive free rural mail delivery, which is of the utmost advantage to the residents of a scattered community as it brings them in daily touch with the outside world.

The best and only permanent road to make is a stone road; but where this is impracticable, the road should be improved by grading, draining, and, where necessary, changing the location of the old road. Where possible macadamized roads should be made, even if only a mile a year can be constructed. In the western counties there is an ample supply of stone for this purpose, but in the eastern counties where the surface of the country is nearly level, stone for macadamizing purposes is scarce, or entirely lacking. These latter counties, however, do have means at hand, with which they can improve their roads with a small expenditure of money. Many of the sandy roads can be be greatly improved by the admixture of clay, which is often to be found directly alongside of the road. In a number of these counties limestone and shell rock can be obtained at intervals and they make a very serviceable and permanent road. Such roads have been made at New Bern and Goldsboro. Oyster and other shells readily lend themselves to road building, and after being driven over for a short time make a very hard, smooth and permanent road which is very easily kept in repair, as has been shown in the case of the shell road between Wilmington and Wrightsville, New Hanover County. Where the road bed is of a clayey nature it can often be improved by the admixture of sand and gravel, and wherever such roads are crossed by streams, sand and gravel can nearly always be obtained.

In the central and western counties of the State the rock is for the most part granitic in character, some of which is too soft for road purposes; but there is always to be found harder and tougher rocks as hornblende granite, diorite trap, and other eruptive rocks. Often these rocks can be obtained alongside of the road that is to be macadamized, so that the crusher can be constantly moved to more favorable positions as the work progresses. Where railroads are convenient, the crushed stone can be cheaply transported to points where the macadam is needed.

The construction of stone roads has been undertaken in Mecklenburg, Wake, Buncombe, Durham, Alamance, Cabarrus, Haywood, and to a limited extent in Forsyth, Rowan, Granville and Guilford Counties. In many of the central and western counties the roads have been improved by grading, draining, etc. Of the eastern counties considerable improvement has been made to the roads by means of shells, limestone and shell rocks, in New Hanover, Wayne, Lenoir, Edgecombe and Craven Counties.

Mecklenburg County is the pioneer in the construction of good roads, and now it has a net work of splendid macadamized roads extending in all directions from Charlotte to the county lines. This system of building a certain amount of macadamized road each year until all parts of the country shall be accessible by good roads, is being instituted by a number of the counties.

The employment of convict labor on the public roads has been in a large measure the basis of all permanent road improvement in the State. The value of this convict labor is roughly estimated at 75 cents per day, but it would be difficult to estimate in money the real value to the people of the public roads which have been constructed in this way.

The method of building and repairing roads by the old labor system will never make good roads in a county, but there must be a direct taxation to raise funds for this purpose, which will also provide for the necessary machines for road building, etc. The labor system is still in vogue in many of the counties, especially in those in the mountainous sections of the State, and it is in these that the roads are the poorest. In others, convict labor is employed, but there are little or no funds for machines, and while they get a better road than the former counties, they are not permanent.

Regarding the practical value of good roads, the most convincing proof that one would wish is the testimony of those counties that have them. In Mecklenburg County, when the subject of good roads was first considered, it met with strong opposition from both city and country, the former not wishing to be taxed for roads built in the country and the latter not seeing any advantage to be gained, and were satisfied with things as they were. Now all the people both in the city and in the country favor the method in use for building good public roads. This is the same opinion of the people of Wake, Durham, Buncombe, and all the counties that have thoroughly tried the system of building permanent macadamized roads.

The State realizes the value of good roads in that they will attract capital, while poor roads will repel.

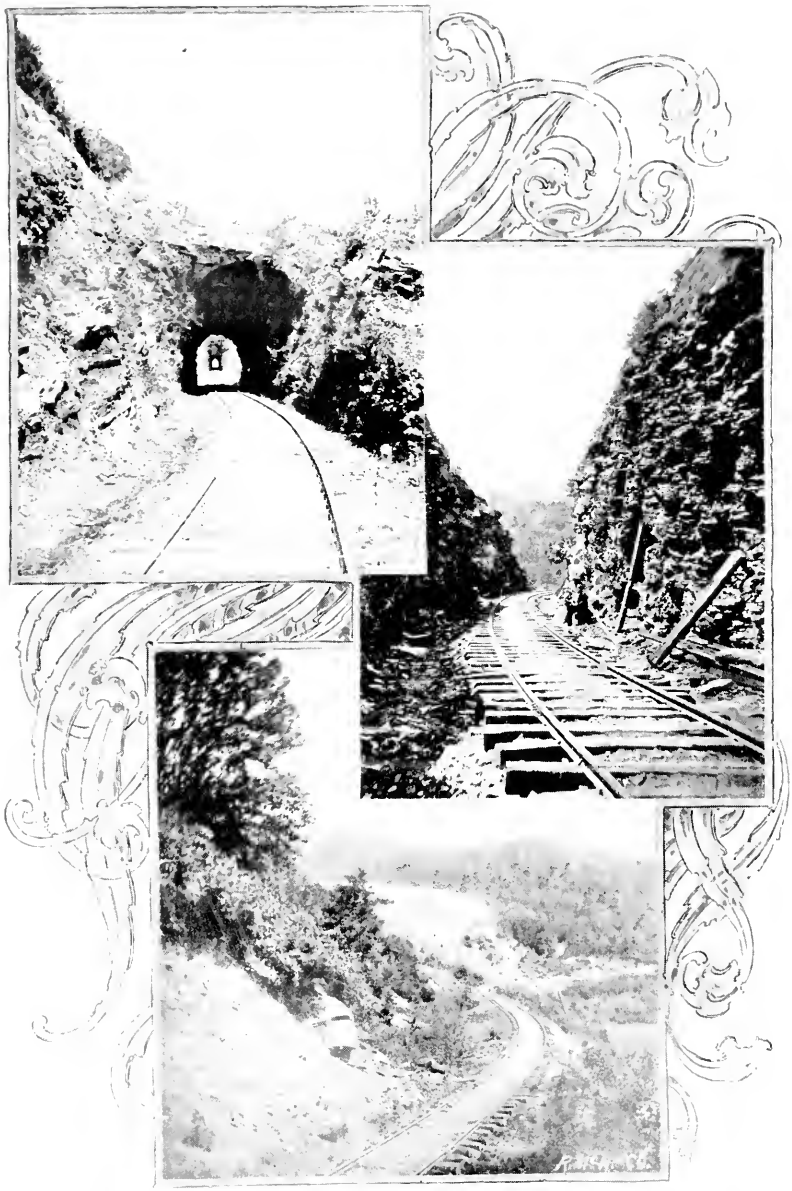
The road congresses that have recently been held at a number of the cities in the State have given a strong stimulus to the good road movement, and the last one which was held at Raleigh, February 11 to 15, 1902, was well attended by citizens from all over the State. It has aroused a great deal of enthusiasm which will undoubtedly lead to practical results. The Congress has led to the formation of the North Carolina Good Roads Association, the officers of which are as follows: P. H. Hanes, Winston-Salem, President; J. A. Holmes, Chapel Hill, Secretary; and Joseph G. Brown, Raleigh, Treasurer.

RAILROADS AND STEAMBOATS.

NORTH Carolina is ramified by three great railway systems, and by a good many individual lines and factions of larger systems. The three large systems are the Atlantic Coast Line System, the Southern Railway System and the Seaboard Air Line System. Chief among the individual lines are the following: Atlantic and North Carolina, Ohio River and Charleston, Chester and Lenoir, Wilmington, Newbern and Norfolk. The Norfolk and Western and Norfolk and Southern have sections of their lines in the State.

The total railway mileage in the State amounts to 3,651, and the total valuation of the railway property is $42,375,651. The telegraph systems of the State are valued at $904,200. The total steamboat property amounts to $220,471.

NAME OF ROAD.	Mileage	Valuation per Mile.	Value of Track.	Rolling Stock.	Other Property.	Total Valuation.
Atlantic Coast Line System.						
Albermarle and Raleigh	54 23	$ 4,000	$ 216,920 00	$ 31,370 00	$ 11,745 00	$ 260,035 00
Cheraw and Darlington	14.41	3,000	43,230 00	2,998 25	2,520 00	48,748 25
Petersburg	7.67	10,000	76,700 00	11,125 08	1,000 00	88,825 08
W'mington, Columbia & Augusta	66.64	10,000	666,400 00	95,942 44	9,772 00	772,114 44
W'mington, Chadburn & Conway	25.53	2,500	63,825 00	4,080 00	500 00	68,405 00
Wilmington and Weldon	174.08	10,000	1,740,800 00	279,322 00	80,440 00	2,100,562 00
Norfolk and Carolina	68.73	8,500	584,205 00	112,529 16	9,210 00	705,944 16
Tarboro Branch	15.10	8,500	128,350 00	16,455 00	5,400 00	150,205 00
Scotland Neck Branch	88.63	6,000	531,780 00	96 353 00	22,170 00	650,303 00
Midland Branch	21.63	3,000	64,890 00	4,000 00	85 00	68,975 00
Wilson & Fayetteville Branch	121.50	10,000	1,215,000 00	224,748 00	26,985 00	1,466,733 00
Nashville Branch	19.53	3,500	68,355 00	12,207 00	2,940 00	83,502 00
Clinton Branch	13 54	3,500	47,390 00	8,738 00	1,280 00	57,408 00
Washington Branch	25.69	4,000	102,760 00	18,587 00	15,320 00	136,667 00
Total	716.91		$5,550,605 00	$918,474 93	$ 189,347 00	$6,658,426 93
Southern Railway System.						
Atlanta and Charlotte Air-Line	48.87	10,000	488,700 00	40,623 98	5,430 00	534,753 98
Atlantic, Tennessee and Ohio	45.43	5,500	249,865 00	5,930 00	6,650 00	262,445 00
Asheville and Spartanburg	43.95	7,000	307,650 00	17,921 89	3,250 00	328,821 89
Charlotte, Columbia & Augusta	14.68	8,500	124,780 00	23,049 34	3,890 00	151,719 34
Danville and Western	.75	3,000	2,250 00			2,250 00
H. Pt. R., Ashboro & Southern	30.25	3,500	105,875 00	8,565 00	4,140 00	118,580 00
Coster & Thomas, Trustees						10,000 00
North Carolina	226.20	8,000	1,809,600 00	114,708 00	150,309 00	1,802,767 00
North Carolina Midland	26.98	2,500	67,450 00		3,860 00	71,310 00
Northwestern North Carolina	29.74 @ 6,500 75.84 " 3,000		420,830 00	27,115 00	12,300 00	460,245 00
Oxford and Clarksville	51.96	4,500	233,820 00	14,756 89	5,875 00	254,451 80
Oxford and Henderson	14.39	3,500	50,365 00	8,765 00	2,300 00	61,630 00
Piedmont	46.57	10,000	465,700 00		4,630 00	470,330 00
State University	10.56	2,000	21,120 00	2,515 00	1,000 00	24,635 00
Statesville and Western	21 12	2,000	42,240 00		3,950 00	46,190 00
West'n N. Carolina	120.35@8,500 85.60" 8,000 125.55" 3,500	8,500 8,000 3,500	2,147,200 00	118,645 00	43,230 00	2,309,075 00
Yadkin	43.90	2,500	109,750 00	8,310 00	4,000 00	122,060 00
Total	1,062.69		$6,647,195 00	$390,905 01	$ 255,014 00	$7,031,264 01
Seaboard Air-Line System.						
Palmetto	7.33	2,000	14,660 00	1,598 00	75 00	16,333 00
Carolina Central	205.29 @ 4,500 53.10 " 9,000 25.58 " 6,000		1,555,185 00	211,477 00	26,655 00	1,793,317 00
Durham and Northern	43 87	4,500	197,415 00	17,420 00	5,800 00	220,635 00
Georgia, Carolina and Northern	15.86	9,000	142,740 00	4,324 94	2,500 00	149,564 94
Louisburg	10 33	3,000	30,990 00		450 00	31,440 00
Murfreesboro	6 29	2,000	12,580 00		200 00	12,780 00
Pittsboro	12.30	2,000	24,600 00		400 00	25,000 00
Raleigh and Gaston	113.53	10,000	1,135,300 00	301,570 00	23,375 00	1,460,245 00
Raleigh and Augusta	10.72 105.18	3,000 9,000	32,160 946,620	24,058 00	13,800 00	1,016,638 00
Roanoke and Tar River	35.71	4,000	142 840 00		4,420 00	147,2 0 00
Seaboard and Roanoke	20.38	10,000	203,800 00	43,000 58	2,900 00	249,700 58
Total	685.47		$1,438,890 00	$603,448 52	$ 80,575 00	$5,122,913 52



SOUTHERN RAILWAY—ASCENT OF BLUE RIDGE—THROUGH TWO TUNNELS.

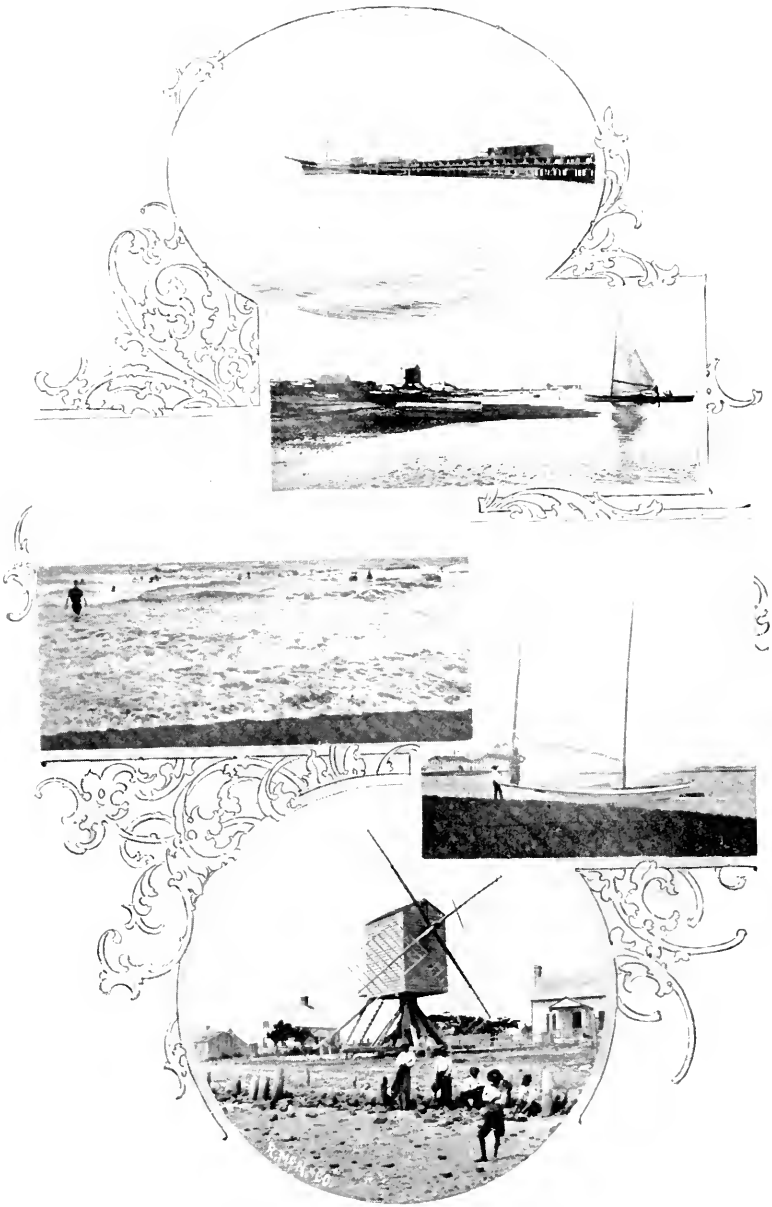
NAME OF ROAD.	Mileage.	Valuation per Mile.	Value of Track.	Rolling Stock.	Other Property.	Total Valuation.
Miscellaneous.						
Aberdeen and Rock-Fish	16.00	1,750	28,000 00	3,000 00	200 00	31,200 00
Aberdeen and West End	4 00 29.75	2,000 2,250	74,937 50	14,705 00	2,490 00	91,442 50
Atlantic and North Carolina	102.26	5,000	511,300 00	64,450 00	43,350 00	619,100 00
Atlantic and Danville	22.49	5,000	112,000 00	19,774 90	750 00	132,524 90
Cape Fear and Yadkin Valley	355.90	5,000	1,779,500 00	225 540 00	36,250 00	2,041,290 00
Carthage	21.60	2,000	43,200 00	3,800 00	1,200 00	48 200 00
Cashie and Chowan	29.00	1,250	36,2 0 00	4,000 00	.....	40,250 00
Wellington and Powellsville	26.00	1,000	26,000 00	6,150 00	.....	32,150 00
Ohio River and Charleston	66.24	4,000	264,960 00	75,205 00	6,500 00	346,665 00
Danville, Mocksville & Southw'n	8.00	2,500	20,000 00	.....	1,000 00	21,000 00
E. Tennessee & W. N. Carolina	3.00	3,100	9,300 00	2,865 00	1,350 00	13,515 00
Egypt	8.00	2,500	16,000 00	12,365 00	.....	28,365 00
Glendon & Gulf Mfg. & Min. Co.	8.58	2,000	17,160 00	1,525 00	.....	18,685 00
Northampton and Hertford	9.00	2,000	18,000 00	2,750 00	325 00	21,075 00
Hoffman and Troy	3 50	1,500	5,250 00	3,200 00	.....	8,450 00
Jamesville and Washington	7.00	2,000	14,000 00	2,800 00	7,000 00	23,800 00
Chester and Lenoir	64.53	3,000	193,590 00	9,815 00	2,320 00	205,725 00
Marietta and North Georgia	13.25	4,000	53,000 00	3,100 00	600 00	56,700 00
Norfolk and Southern	62.07 32 34	6,000 3,000	372,420 97,020	111,853 00	40,300 00	621,593 00
New Hanover Transit Co	3.12	2,000	6,240 00	1,320 00	.....	7,560 00
Norfolk and Western Roanoke & Southern Division Lynchburg & Durham Division	49 66 43.57 12 50	6,500 5,000 1,500	322,790 00 217,850 00 18,750	16,072 52 19,216 77 5,280 00	17,479 00 4,731 00 342 00	356,341 52 241,797 77 25,072 00
Moore County	7 00	100	700			
Raleigh and Western	1.00	1,000	1,000 00	.....	.....	1,000 00
Suffolk and Carolina	25.50	2,500	63,750 00	10,605 97	923 50	75,278 47
Suffolk Lumber Company	9.00	2,500	22,500 00	7,000 00	.....	29,500 00
Warrenton	3.12	2,000	6,240 00	2,500 00	700 00	9,440 00
W'mington, Newbern & Norfolk	90 49	3,500	316,715 00	43,560 00	20,670 00	380,945 00
Wilmington Railway Bridge Co.	2.40	.....	80,000 00	.....	.....	80,000 00
Wilmington Sea Coast	11.81	3,000	35,430 00	4,000 00	200 00	39,630 00
Winton	15 00 5.00	2,000 500	30,000 00 2,500 00	8,350 00	150 00	41 000 00
Total	1,171.51		$1,816,352 50	$684,203 16	$ 182,739 50	$5,689,295 16

HEALTH AND PLEASURE RESORTS.

THE geographical location and geological formation of the State are peculiarly adapted to the production of those conditions which make for health in general. As to climate, we occupy the vantage-ground of the golden mean, inclining somewhat to the warmer side. It is neither too hot nor too cold. While we have a generous summer, long enough to mature two crops of many kinds, the thermometer does not rise as high as it often does far to the northward of us, and the summer temperature is not usually oppressive. We also have a sufficiency of winter, with occasional light snows, and once in every few years, ice thick enough to skate on in safety, and with rain and dark days, but on the whole it is bright and sunshiny. The late Bishop Lyman, who lived many years in Italy, said that the climate of Raleigh was superior to that of Florence—more sunshine in it. Our winters are just long enough and severe enough to restore the snap and vigor and elasticity that may have been weakened by the summer—we are enabled to fully recoup any physical wastes attributable to long continued heat. The conditions, so far as they relate to the proportion of heat and cold, are just those which, while permitting easy and comfortable living from the opportunities afforded for work throughout the entire year—the special advantage of the South—do not enervate and weaken the desire and power of work. In a word, the conditions are exactly suited to the healthful and pleasant existence of the average man.

Although it is not as dry as it is in some sections of our country, still in our long leaf pine, sand hill region, where the porous soil takes up the water so rapidly that one can walk dry-shod in a half-hour after the heaviest rain, it is dry enough for the consumptive, and yet he can enjoy the sight and smell of the "blessed rain from heaven," and be lulled to sleep by its patter on the roof. Neither can we boast so great elevation as some other localities, but in the matter of altitude we have sufficient variety, from the sea-level to Mitchell's Peak, of nearly 7,000 feet, to suit any constitution. Roan Mountain, which it is interesting to know has a greater variety of flora between its summit and half-way to its base than the whole continent of Europe, is noted for the relief its rare pure air affords to the sufferer from hay-fever. For consumptives the high mountain plateau of Asheville and vicinity, including particularly the country about Highlands and Blowing Rock, affords very favorable conditions. To those of this class who do not bear high attitudes well the pure dry air of the pine-clad sand hills of Moore and adjoining counties, of which Southern Pines is the centre, often proves a healing balm. It is said by many who have tried the pine country further south and that of our State, that they prefer the latter because the climate is not so enervating.

In this day of scientific accuracy an appeal to carefully collated facts is desirable. Upon turning to the mortuary tables of the Fifth Biennial Report of the State Board of Health, we find that the average total death rate in the larger cities and towns where the records are care-



VIEWS AT MOREHEAD AND BEAUFORT.

fully kept is 15.5 per thousand—for the whites 12.5, and for the colored 20. It is interesting to note that in those located in the so-called malarious section the death rate is actually less than the average for the whole number.

The machinery provided by the State for protecting the health of its citizens consists of a State Board and of County Superintendents of Health—to say nothing of municipal organizations for that purpose. The former has general supervision of the sanitary interests of the people and the latter are charged with the particular care of those in their respective counties. Any special information that may be desired can be obtained by addressing the Secretary of the State Board at Raleigh.

MINERAL SPRINGS.

Perhaps this State, with all its advantages of health, climate, soil and natural resource, stands as little in need of the health-giving waters so widely distributed by nature's munificent hand, as any on the continent. But it seems that the scriptural assertion that "unto every one that hath shall be given," holds good with North Carolina. Certainly almost all parts of the State boast of some mineral spring whose waters bring health by assisting nature in restoring the afflicted. True, these are mostly of local fame but there are some, which, without disparagement to the others, may be briefly alluded to because of accessability and that indispensible desideratum—good hotels.

Hot Springs.—Some thirty-seven miles west of Asheville, on the French Broad River, is located the Hot Springs, known for nearly a century as Warm Springs, and famed for the virtue of its thermal waters. The waters bubble in bold volume near the river at a temperature varying from 98 degrees to 104 degrees, and it is claimed are very effective in baths and for drinking, for rheumatism, gout, nervous prostration, dyspepsia and in some forms of malarial trouble.

All the conveniences of modern fashionable hotels are provided. The bathing facilities are ample and lavish. It is the resort of fashion and wealth as well as the afflicted.

Haywood White Sulphur Springs.—Within a fraction of a mile from the town of Waynesville on the Murphy branch of the Western North Carolina Railroad, is the charmingly located White Sulphur Springs. The water is distinctly sulphur, is cool and not unpleasant to the taste, and is claimed to be efficient, when taken fresh from the spring, in troubles requiring either diuretic or diaphoretic treatment. It is not a potable water. The hotel is well equipped to entertain the guests who flock to its hospitable board each season. And in this respect the town of Waynesville divides the honors, as it is a much frequented resort.

Glen Alpine Springs.—Beautifully situated among the South Mountains in Burke County, and some eleven miles from Morganton, and which may also be reached from Glen Alpine station on the Western North Carolina Railroad, is the Glen Alpine Springs. The water con-

tains quite a variety of beneficial mineral, such as potassium and sodium sulphate, calcium and magnesium carbonate, carbonate of iron, etc. There a small but comfortable hotel awaits the guests.

Connelly Springs.—This favorite resort is ten miles west of Hickory, at Connelly Station, on the Western North Carolina Railroad. It has been growing in popularity for a number of years, and to its chalybeate waters are attributed many virtues, being diuretic in effect, as well as efficacious in dyspepsia and like troubles. The hotel is large and affords many comforts and conveniences. It is within a few yards of the railroad track, and far enough west to afford a pleasant summer climate for its large patronage.

Sparkling Catawba Springs.—Eight miles north from Hickory, on the Western North Carolina and Carolina and Northwestern Railroads, situate in a vast grove of forest trees, may be found the ever popular Sparkling Catawba Springs. The country surrounding the springs is beautiful, partly wooded and partly in field and orchard, affording luscious fruits in season.

"The hotel accommodations are ample; the waters of the springs embrace blue and white sulphur, and chalybeate and, from the known benefit derived by well-attested cures in their use as an alterative and tonic influence over the lymphatic and secretive glands they are unsurpassed, and never fail to strengthen the gastric juices of the stomach and increase the appetite, assist the digestion and promote the assimilation of food, thereby imparting tone and health to the person."

Vade Mecum Springs.—These springs, located in Stokes County, are now owned and operated by the Vade Mecum Spring Company, of Winston-Salem, North Carolina. The waters are widely known as a specific in all diseases of the liver, stomach and bowels. In all blood taints and poisons relief is usually found in the liberal use of this water and in all morbid conditions from mal-nutrition also. Kidney, bladder and uterine diseases are also benefitted by its use. Hotel accommodations are ample and the springs are now operated as an all-the-year-round resort. The water is shipped in large quantities to a constantly increasing circle of users.

Barium Springs.—A few miles from Statesville, in Iredell County, is situated the "Poison Spring," as it was formerly known. It is now called the Barium Spring. Analyses show that it contains, in varying proportions, barium chloride and sulphate, iron, soda, sulphur, magnesia and phosphoric acid in such combinations as to render it a curative and tonic agent, the equal of any mineral water known. It has no visible outflow, and the water remains at a constant level, never freezes, never stagnates, and it wlll keep pure and retain its curative efficiency indefinitely.

There is no development of the locality as a resort but the Presbyterian Orphanage is located near the spring. It is a remarkably healthy locality.

Moore Spring.—Not far from Danbury, in Stokes County, is situate the Moore Spring, which is said to be remarkable for its efficacy in the treatment of cutaneous affections and blood impurities. It is

not a resort, but is remarkable from the mineral contents of its waters. Chemists report potassium and sodium sulphates, sodium chloride and phosphate, calcium and magnesium carbonates in rather astonishing quantities.

Piedmont Springs.—Also in Stokes County, near Danbury, are to be found the Piedmont Springs, which are in high repute as a tonic and alterative water. There is a good hotel large enough to accommodate the visitors annually seeking the elevated climate and curative waters.

Bromine-Arsenic Springs.—This mineral spring is located at Crumpler Post Office, in Ashe County, on north fork of New River, and in a picturesque, healthy climate. The water, as shown by analysis, contains beside the usual ingredients sodium arseniate and sodium bromide—hence the name. It is a potable water and is recommended for eczema, nausea, debility, dyspepsia, rheumatism and all blood, skin, stomach, kidney and nervous complaints. A hotel which will accommodate a hundred guests, royal porcelain baths and a good table await the guests. The water is sold in many parts of the United States.

Cleveland Springs.—These are about two miles from Shelby, which place is reached both by the Carolina Central and the Three C's Roads, and are situated in a region of grandly rolling hills. The hotel accommodations are ample and agreeable in all particulars, and the resort to these springs is large. The springs are many and of varied character, the waters flowing in large volume; for the treatment of certain diseases the white sulphur is the panacea; for some others the red sulphur and iodine are required; for others the chalybeate is best suited, whilst for others the best results are obtained by drinking the waters of several alternately. The ailments which seem to be mostly under the control of these waters are dyspepsia, rheumatism, malarial troubles, insomnia, etc.

Lincoln Lithia Springs.—These springs are located one mile from the town of Lincolnton on the Seaboard Air Line Railroad, and in the Piedmont Plateau Region of the State, and surrounded by a beautiful undulating farm country noted for its salubrious climate. The spring is bold, and the waters contain, as shown by analyses, in each gallon of 277 cubic inches, 2.81 grains bicarbonate of lithia, besides sulphate of potash and lime, and bicarbonates of iron, lime, magnesia and soda. It is noted among the better lithia waters of the country, and is highly recommended in the treatment of Bright's disease, bladder and kidney troubles, gout, rheumatism, dyspepsia and nervous diseases. It is a potable water and has a wide distribution, and it is highly praised by those who have tested its virtues. The Lincoln Lithia Inn is a new hotel with modern appointments; is well kept and guests find in it a pleasant environment.

Ellerbee Springs.—These springs are situated about twelve miles north of Rockingham in Richmond County, and are locally much valued. The waters have an abundant flow and consist largely of iron and sulphur in their mineral contents. Remarkable as it may seem, the waters of this resort are reported as an effective remedy for hay fever. While the patients suffering from this malady have been few, there is no failure to cure recorded against the springs.

Jackson Springs.—This health resort is situated in Moore County, four miles from West End, on the Aberdeen and West End Railroad, and some fifteen miles west of Southern Pines. The flow of the springs form a rivulet of clear, cool water. The value of the springs "as a remedy for and cure of indigestion in all its forms, particularly dyspepsia and diarrhoeal diseases, kidney and bladder troubles, dropsy, cystitis and all debilitating causes is well-known." The location of the hotel, which is entirely comfortable, near the springs, in the heart of the long-leaf pine and the deep sand section of the State, the natural sanitarium for those afflicted with lung diseases, makes the springs all the more valuable.

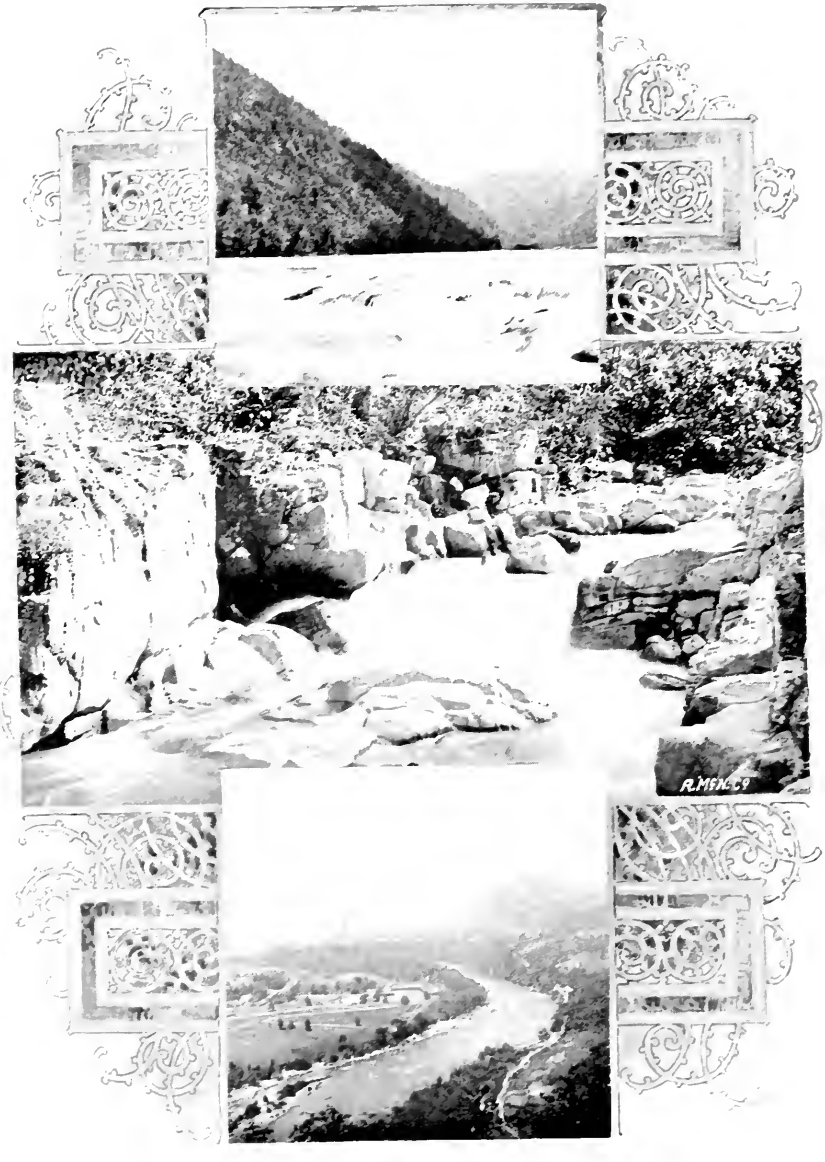
Red Springs—In Robeson County, on the Cape Fear and Yadkin Valley Railroad, at a station bearing its name, are located the Red Springs, the medicinal virtue of whose waters has been known for an hundred years. There are two springs, both are strongly chalybeate, showing respectively 1.35 and 1.90 per cent. of bicarbonate of iron, while their other mineral contents are desirable in a health water. The Hotel Townsent is open all the year, is new and modern in its appointments, and is beautifully located in a grove of trees. The surrounding country and streams afford sport during winter and summer with gun and rod to guests who are able or inclined to take the exercise.

Panacea Springs.—These celebrated springs are situated near Littleton, on the Raleigh and Gaston branch of the Seaboard Air Line Railroad. There is a good hotel on the premises.

The waters have only become widely known during the past few years, but have already acquired fame at home and abroad. The claims for efficacy in many maladies are very extensive, but appear to be well sustained. For dyspepsia they are said to be very beneficial; also for chronic diarrhœa, scrofula, kidney troubles and other diseases. The waters lose none of their virtues by transportation, and are sold by the drug stores throughout this and the adjoining States.

The Seven Springs.—They are as remarkable for their locality and the nature of their surroundings as for their genuine virtues. They are in the southeast corner of Wayne County, eighteen miles from both Kinston and Goldsboro, but most readily and quickly reached from LaGrange, on the Atlantic and North Carolina Railroad, seven miles north of the springs. The springs lie almost immediately on the banks of the Neuse River.

"The springs, as their title implies, are seven in number; all bubbling up in clear, strong volume, in close contiguity and enclosed and encased in a spring-house of remarkably limited though absolutely convenient dimensions. The waters are as different in their qualities as they are in their numbers, and prove effective in malarial diseases, indigestion, insomnia, kidney troubles, including Bright's disease, weakness and inflammation of the eyes, loss of appetite, etc. These springs have been known for many years, and have been the resort of the surrounding country, but only recently have they become known to the more distant public. A good and capacious hotel now makes it practicable to distribute their benefits among a much larger circle of health-seekers."



VIEWS AROUND HOT SPRINGS—SOUTHERN PACIFIC R.R.

SEASIDE RESORTS.

It may be said here in introduction that the remarks quoted below on New Bern, from Mr. Hallock, are applicable almost in their entirety to all the North Carolina coast towns.

Nag's Head.—This noted seaside resort is in Dare County, just opposite Manteo, on Roanoke Island. It is annually frequented by large numbers of visitors who lave in the blue waters of mother ocean and feast upon its gastronomic rarities. Mr Frank Vaughn says of this resort: "It is in the midst of a cluster of high sand hills, with ocean on one side and sound on the other, the two but half a mile apart, is one of the most delightful places for summer residence in the State. From the tops of the bald, yellow hills, the scenes on a clear summer evening, at the sunsetting, are glorious in the extreme. Away in the east reaches the rolling, moaning sea; in the west the red sun sinking down into the waters of Albemarle, and on the south Roanoke Sound and historic Roanoke Island, green and beautiful in the midst."

New Bern.—New Bern has held its enviable place as a social center ever since the early colonial days. It is now becoming a winter resort. Mr Charles Hallock, at present chief editor of the new "Western Field and Stream," published at St. Paul, says:

"During my six consecutive winters at New Bern, I have observed that when the winter was at all stormy in that locality, it was sure to be reported very much worse in the regions adjacent by the Signal Service. For instance, if we had a slight flurry of snow in New Bern there would be a severe blizzard northwards, extending over a wide area of country, or, if a hurricane came up from the tropical seas, wrecking and inundating the Georgia and South Carolina coasts, its force would be spent before it reached here, and we would get only the feather edge of it. If the weather is at all foul in this section, at any season, it is a short duration. The rainfall is light in winter and cloudiness the exception. Quiescence is the normal condition, and there is seldom a meteorological disturbance.

"From these observations I make the unavoidable deduction that New Bern has the most equable winter climate on the coast; and is therefore a desirable place for invalids as well as those merely in quest of warm and sunny weather. Sportsmen find shooting and fishing in variety.

"I do not see what it is to prevent New Bern from becoming first choice of all who go south for the winter; and it is claimed by residents to be equally delightful in summer."

Beaufort and Morehead.—The proximity of Beaufort and Morehead City together with the near resemblance of their topographical conditions renders a separate description of these two healthful watering places unnecessary. In distance apart they are about two miles, and about the same distance from the Atlantic Ocean, and about twelve miles northwest from Cape Lookout; in latitude 34.75 north and longitude 0.50 east from Washington. They are situated in Carteret County, on the extreme eastern border of the mainland, the shores of which are washed by the waters of Bogue Sound.

Morehead is built upon a point of land reaching out into the sound, which gives it a delightful exposure to the summer breezes from almost every direction. It is immediately on the line of the Atlantic and North Carolina Railway near its eastern terminus, and on this account is the more accessible to visitors,

Beaufort is separated from the terminus of the railroad in a direct line, by Newport River, and is reached from this direction by ferry-boats, which make close connection with all the trains. Beaufort is preferred by some on account of the ocean view, and more direct breeze.

Fish and game abound in the neighboring waters and forests which are easily accessible to sportsmen. The boating and bathing facilities are rarely excelled in any other watering place, the beach for surf bathing being exceptionally fine. The hotel accommodations are ample.

Southport—The attractions in and near Southport are of a kind to interest every class of tourists, from the sportsman to the antiquary. Fishing is good in every month, and wild fowl and other game are plentiful in the winter season. For the invalid, the climate is unsurpassed, and outdoor recreation can be indulged in almost uninterruptedly, as the ground is always dry, the drainage being sufficient to carry off and prevent any standing water; the town lying twenty to thirty feet above sea level.

The tourist at Southport has many points of interest to visit within a short distance. Fort Caswell, less then two miles away across the harbor is one of the best preserved, interesting and historical ruins in the South. Smith's Island less than four miles across the harbor, is a wonderful sub-tropical island, with palmettoes upon it thirty and forty feet in height. The upper portion of it is covered with a dense growth of plants and trees, and the waters around it abound in fish. Fort Fisher, five miles up the Cape Fear River is a historical spot; it may easily be reached from Southport. These are a few of the most noted places, there being a number more well worth visiting.

Carolina Beach.—Carolina Beach is a summer seaside resort reached by boat and rail from Wilmington, about an hour's ride from that city, and is situated on a fine stretch of sandy beach directly facing the Atlantic Ocean. It is the favorite resort during the summer months for families who own or rent cottages. Its bathing is very fine, and the celebrated "Pig fish" is caught in countless numbers along the shore. In the season a hotel is open for the accommodation of guests.

Wrightsville.—Wrightsville, or Wrightsville Sound, is eight miles east from Wilmington, and in full view of the Atlantic Ocean one mile distant across the sound. Between the sound and the ocean is Wrightsville beach, a narrow strip of sand two hundred yards wide. The Seacoast Railroad runs from Wilmington to Wrightsville, thence across the sound and along the beach for two miles. In winter there are four trains a day from Wilmington, and during the summer there are from ten to twenty trains daily. There is a free delivery of mail twice a day, and telephone and telegraph communication with Wilmington.

PINY-WOODS RESORTS.

"Our Pines are trees of healing."

North Carolina has a large region of piny-woods noted as a resort for those suffering from throat, lung and kindred diseases. The healing touch of nature, though seeming slow, is yet more cunning than science. Once disease takes hold in the harsher northern climates, the sufferer must find a milder and more benignant sky, and find in its genial, dry and invigorating air a balm to heal. There are healing virtues in the balsamic breath of the long leaf pine. Professor Schrieber of Vienna, states: "that turpentine exhaled from the pine is the most effective agent known for converting the oxygen of the air into ozone." and Mr. Tufts in his booklet, says: "Ozonized oxygen is a powerful antiseptic and disinfectant. Its presence in the atmosphere gives the latter a remarkably healing quality for diseased throat and lungs." Thus we have the secret which brings health and hope to the pilgrims to our Mecca of Pines.

Southern Pines.—Among the piny-resorts of North Carolina, Southern Pines justly ranks first, not only because it was the first established, but because of the excellent location and the salubrious, invigorating and health-giving air, laden with the healing fragrance of the "bled" pines. This favorite resort is located in Moore County, near the central part of the State, and on the Seaboard Air Line Railroad. It is on the culmination of an immense sandy ridge, running in a northeast and southwest direction through the State, and traceable in its gradually diminished elevations and characteristics in several of the States to the southward. Locally, this is known as "Shaw's Ridge," the name coming from a prominent family long resident here.

Dr. G. H. Sadelson, the first to adopt the region as a home, says: "A little more than fifteen years ago, in quest of health, I was directed to this section by the late State Geologist, Professor W. C. Kerr, as the highest, dryest section in the whole long leaf pine belt. I came, and getting off the train at Manly, the then nearest point to "Shaw's Ridge," I found myself half shoe deep in clean sand and surrounded by a dense pine forest, and breathed an air saturated and made gratefully fragrant by the balsamic odor of the turpentine pine. Having made remarkable improvement in a short time, I examined the surrounding country including "Shaw's Ridge;" making almost daily journeys, mostly on foot, and was so favorably impressed with its natural sanitary advantages that I expressed my views through the press, at the same time giving my views to Professor Kerr, with whom I corresponded." This was the starting point, the foundation of the Southern Pines of to-day. It is now fully established among the health resorts of the United States, and is well and favorably known to the medical profession of this great country. People from all parts of the United States visit the place on the advice of physicians, and year by year sees its expansion, the boarding houses giving way to hotels, and the hotels to the more pretentious 'Inns.'

"The Seaboard Air Line Railroad has encouraged, fostered and

promoted the growth and development of Southern Pines, and should not be omitted even in so brief a sketch as this must be of this resort. Southern Pines is within twenty-two hours of New York City."

Pinehurst.—"Rest" the pines say to the pale health seeker, "the noises and the cares that have infested thy life elsewhere come not here. Rest, and be healed by day. Sleep and be healed by night. Night and day we will not fail to encompass thee with life-giving influences."

The magic wand of wealth and philanthropy, in the hands of Mr. J. W. Tufts, of Boston, Mass., has caused to spring from the virgin forest of Moore County a beautifully built city, as a resort for the afflicted. Five thousand acres are included in the holding, and on it has been laid out picturesque Pinehurst. The celebrated landscape artist, Frederick Law Olmstead, was employed, and his taste and skill are amply displayed in the work at this resort. The Board of Agriculture also rendered assistance in locating this enterprise. As its field is rather unique in that its philanthropic originator has built with a view of relieving the afflicted with small means, as well as the more fortunate, financially, it will be worth while to reproduce a paragraph from his little book: "Pinehurst is not intended to be a sanitarium for hopeless invalids. It has no hospital features. It is a bright cheery village, artistically laid out, possessed of all modern comforts and conveniences, carefully controlled so as to make its sanitary and other attractive conditions permanent. It invites those in whom disease has not progressed so far as to render recovery impossible. To such, whether of large or small means, it offers advantages absolutely unequalled."

Pinehurst is located six miles from Southern Pines, on the Seaboard Air Line Railroad, and four miles from Aberdeen, on the Aberdeen and West End Railroad. An electric car line connects Southern Pines with Pinehurst. The Holly Inn, new, modern in all appointments, was the chief hostelry at Pinehurst before the opening of the palatial "Carolina," which ranks among the largest and finest in the South. The water is exceptionally fine, being supplied from a system of deep bored wells.

MOUNTAIN RESORTS.

The tourist from the North or East gets his first view of the mountains from Hickory, Catawba County, at the junction of the Western North Carolina with the Narrow Gauge Railroad leading from Chester, S. C., to Lenoir.

Hickory, a vigorous town, is hardly a mountain resort, but is the gateway to one of the most attractive, borrowing from the hills above and the plains below qualities of scenery, climate and people which make it, its denizens and surroundings typical of both.

Unsurpassed for dryness, for it lies between the wet belts of summit and lowlands, sunshine and salubrity, its air supplied from the great cataract falling down from the hills to be met and tempered by the warmer currents from the south; its population combining the strength of the sterner with the polish of the milder sections, it is a

place where one may well spend some days before going higher to accustom himself to the sight of the mountains, and the effect of the mild yet bracing atmosphere.

Fifteen hundred feet above sea level it has a country about it that yearly attracts many sportsmen for quail shooting. It also boasts of one of the most charming hostelries in the land, Hickory Inn, accommodating 150 guests and with all the modern conveniences. The piazzas are broad and sheltered, and the lofty tower at the top of the building looks out upon the great mountain system. One hour by rail brings the tourist to Lenoir.

Lenoir.—This pretty town marks the western terminus of the Chester and Lenoir Railroad, and here the tourist forsaking the cinders and dust of the railroad takes private conveyance for the resorts on the mountain tops, now visibly piled in great blue heaps against the western sky. This little town, filled with cultured, hospitable people, and nestling close to the mountains, is a charming half way place. It is not so cool as the mountains; has good markets, good hotels and boarding houses, good livery and a hearty welcome to the traveller. The handsome and modern Lenoir Inn is in every respect a first class hotel and well kept according to the most exacting requirements. A few weeks of rest and recreation can be spent here. Indeed, its climate is preferred by those who find the mountain resorts too cold. But those bent on the glorious scenes from the crest of the Blue Ridge, take carriage, and in a few hours over a fine turn-pike of twenty miles reach the goal.

Blowing Rock is the name generally applied to designate the mountain resort. But there are two ends to the resort, and each having a post office, they are separated in name; thus the Green Park and Blowing Rock contingents of the same straggling village, more than two miles in length, and along this distance are scattered hotels, churches, cottages, stores, livery stables, etc.

These places are about 4,100 to 4,300 feet above the sea; 2,300 feet higher than Lookout Mountain or the Catskill Mountain House. There, summer reigns with moderate sway, during the season 85 degrees is the highest temperature recorded; for two successive Augusts the daily maximum ranged from 67 degrees to 84 degrees. The days are pleasant, the nights more pleasant if possible; a seat by an open fire and a sleep under blankets make the dark hours delightful, nerves regain tone, muscles grow strong, blood reddens, dyspepsia and headaches flee away in the life-giving atmosphere above the clouds of the valleys.

Where a great spur joins the Blue Ridge an overhanging shelf of rock projects from the top so far over the "Globe" or valley of John's River, as to catch and for a time confine the currents of air sent up from the depths, as the northerly winds, finding no outlet, strike against the face of the cliff. The air presently finds egress over the top, and the force with which it boils up gives the name of Blowing Rock to the beetling crag. When the winds are right any light article, handkerchief, scarf, hat or bush thrown from the apex, instead of reaching the bottom thousands of feet below, is borne upward and

back again to the spot whence it was dismissed. The name of the cliff has become that of the village near by where the road to Boone intersects with the old turnpike. Within five minutes walk of the Rock, near the crest of the Ridge, just between the springs, sources of New River and the Yadkin, is Green Park Hotel, so exactly placed as to turn the rainfall from the roof partly toward the Ohio and partly toward the Pee Dee Rivers.

Blowing Rock Hotel—Is also on the crest of the ridge, about one and a half miles north of Green Park, on a bold cliff-like projection affording from its piazzas charming views of the valley below and of the distant peaks beyond.

The Watauga—Is the pioneer hotel and is at the extreme north end of the village, about two miles from Green Park. It has undergone several remodelings and is now a comfortable place, with ample grounds and the finest spring of water on the mountain.

Besides there are numerous boarding houses, all open for the accommodation of the five thousand visitors annually flocking to this favored region for rest and recuperation.

Boone.—Eight miles northward lies Boone, the county seat of Watauga, named for the famous hunter and pioneer, whose lodge fires blackened the heap of stones yet remaining and to be seen in a meadow there and cherished as Boone's chimney.

Here, several hotels, with good cookery and cheerful attendance, make the place a resort. It is a quiet, restful town, suited for study and retirement, albeit now connected with the world by a new and admirable road, the most beautiful and of easiest grade in all the hill-country. One may ride, drive or walk, at any pace he will, nothing obstructs his path; no thoroughfare in the county, unless it may be the military pike at the National Chickamauga Park can compare with it.

Linville.—By the picturesque Yonhallossee Pike from Blowing Rock or by a shorter one from Pinola can and should be reached the renowned Linville, with its great scope of well governed land, its matchless scenery, its range of flora and fauna, temperature and climate, hill and valley, from the crown of Grandfather Mountain to the smooth green meads bordering fair Linville River and among other good things its home-like Eseeola Inn. This is a mountain resort which begun at the other end from most of them. Usually the public builds them from a spring and cabin to a fountain and a town. In this instance, capitalists bought a dukedom so far as territory goes, laid it out for country and city, farms and gardens, with a picturesque town plot on the river, at the junction of Grandmother Creek, cleared undergrowth, opened forest glades, views and groves, cut paths, built bridges and best of all "Yonhallossee" Pike from Blowing Rock along the southern slope of Grandfather. Built an inn, cottages and then called the Nation's attention to the fact that at Linville, with ten miles of trout stream and thirty miles of graded driveways, was a town ready-made, a watering and breathing place without mark of wear and use, which by the magic of money, taste and foresight, had sprung up as yet untenanted, all fresh, sweet and new, ready for guests.

Pinola.—Now connected with the E. T. and W. N. C. R. R. at Cranberry, the little mountain town of Pinola is beginning to attract attention. Near Linville, and within easy reach of the beautiful Linville, falls and river, which are well stocked with the gamey rainbow trout, it is surrounded by vast forests of towering white pines, one of the few large bodies of this kind of timber found in the Southern Appalachians. Good hotel accommodations make the place doubly attractive, the Pinola Inn being up-to-date and well kept.

Cranberry.—Known for years as the location of a great body of high grade iron ore, the little town of Cranberry has let its other advantages go by unnoticed. Now, with a new and handsomely appointed hotel, well kept and beautifully located and surrounded, it is ready for the seeker after an ideal summer mountain home. The Cranberry Inn is close by the railway station and is easy of access by way of the E. T. and W. N. C. R. R. from Johnson City, Tennessee.

Roan Mountain.—Cloudland and empire of the sky, the highest of resorts, loftiest of hotels, most picturesque of summits, can be readily reached from Linville, or from Johnson City, E. T. and V. R. R., via Cranberry, 6,342 feet above sea level. Commanding views, as indescribable as they are numerous, attract and keep the beholder; the top of this most beautiful mountain is seven miles long, a natural prairie, interspersed with groves, dotted with flowers and shrubbery; it no longer serves merely as a pasture for the flocks and herds of the farmers below, a nobler destiny has been found for it, and travelers swarm over its broad expanse. It does not boast of hunting or fishing, such sports are not to be looked for above the clouds, but scenery, the world spread out below, wholesome wine-like air, pure water, zest for food amply provided, comfortable lodging, it challenges the best of our hill country resorts.

Asheville.—Buncombe County and its superb capital, Asheville, have for years been the best advertised places in the State. Asheville holds peculiar prominence as a resort, by reason of its location, its railroad facilities, its many fine hotels, and its easily accessible views —splendors of scenery. Then the location of the vast Vanderbilt domain has given it additional importance. It is thronged with visitors winter and summer. In winter by those who seek a milder residence for the extreme cold of the North, and especially by those who suffer with pulmonary troubles; while in the summer the majority of its guests come from the warm slopes of the South Atlantic States, seeking a cooler and more salubrious climate for the heated term.

The hotels of Asheville and vicinity are of National reputation. The great Battery Park, a Queen Anne edifice 300 by 175 feet in size and three stories high, is too well known to need any description here. The Kenilworth, at Biltmore, only two miles out and adjoining the great Vanderbilt estate, is another high class place for the rest seeker, while such hotels as the Berkly and Swannanoa, both well within the business center of the town, and the Oakland Heights, a litle over a mile from the Court House, combine to make Asheville one of the best provided towns in the State in this respect.

Arden Park.—Between Asheville and Hendersonville, nine miles

from the former on the Asheville and Spartanburg Railroad, has an excellent hotel largely patronized by exclusive guests from the cotton and cane States, as well as by the same class from the North.

Hendersonville.—Hendersonville, long a favorite resort for the aristocracy of the South, is warmer and dryer than other towns along the Ridge, well laid out and with shaded streets, good water and charming scenery. Its hotels are comfortable, well kept, at moderate prices, and attract a steady custom year after year.

The last few years have shown a wonderful growth here. Hotels have multiplied and increased in size until now but few towns of equal population can boast of better or more elaborate accommodations for the summer visitor or health seeker. Hendersonville is undoubtedly one of the coming towns of the mountains.

Highlands.—At Highlands, in Macon County, a colony of health seekers from the North, blended with Southern settlers, have made this spot, near the southern verge of the Blue Ridge, at an elevation of nearly 4,000 feet above the sea level, a very desirable location. It has well kept hotels and many visitors, and is one of the best of all the mountain resorts within our borders. Its summer patronage is now quite large and is rapidly increasing.

The Sapphire Country.—About five years ago a company of progressive, far-sighted men secured control of a large tract of land in one of the most beautiful and grand mountain sections of the State, bordering the counties of Transylvania and Jackson. They laid out and built on the most approved plans miles upon miles of beautiful mountain roads, built dams and made lakes and ponds, put up a series of magnificent hotels and cottages and in an incredibly short space of time made the rugged mountain wilderness habitable even on a luxurious scale. They stocked and restocked the streams with trout, protected the native wild game in the forests, cared for the timber, and, while changing the natural beauties of the country as little as possible, they rendered them accessible to the public.

In this section of the State the mountains take on a more rugged aspect than in some others. The Falls of the Whitewater are some three hundred and fifty feet in height and easily accessible by good, well graded roads. The great Horsepasture Falls are over a hundred and fifty feet high, of good volume and strikingly grand. Fairfield Lake has a drive of over four miles around its shores, on a road better than most city streets. But the beauties of the country are too many and too varied to be detailed in a short sketch of this kind. They must indeed be seen to be appreciated. The Franklin Inn, at Brevard, and the Sapphire and Fairfield Inns and Toxaway Lodge, all in the Sapphire country proper, besides numerous cottages, are new, modern and on the most sumptious scale and are amply able to care for the many thousands that have learnt of and already patronize the region.

Waynesville.—No mountain resort in North Carolina has superior advantages to this lovely Haywood County town. The Haywood White Sulphur Springs are situated here and mention of the place is made in the article on the mineral springs of the State. Apart from that it is a resort of the first order and as such is very widely patron-

ized. It is essentially a town of home-like boarding houses and is surrounded by many urban advantages that are often found lacking in the neighborhood of the more remote mountain hotels. The beautiful and cozy new Eagles' Nest Hotel, five thousand feet above the sea, with a smooth and well graded turnpike right up to the door, is one of the features of the place, if not of the State. It is perched on the extreme summit of Junaluska Mountain and the views and the complete exposure to every breath of health-giving mountain air that blows make it almost unique in its location and advantages.

Flat Rock.—On the Asheville and Spartanburg Railroad in Henderson County, is a collection of exquisite stone villas surrounded by beautiful grounds, built by the wealthiest class of South Carolinians. It has to some extent lost the exclusive character of its former years, and is one of the most delightful and interesting villages in the South. As a resort it is unsurpassed for healthfulness, beauty and romantic associations. "St. John's-in-the-Wilderness," a sanctuary erected by the people from the low country is attractive to all who have read "The Land of the Sky." Count and Countess du Choiseul sleep quietly in their tombs near the entrance, and a finely graded road leads to their lonely Chateau.

Hot Springs.—This resort is treated elsewhere under the head of Mineral Springs. Until its recent development by the Southern Improvement Company it had not the facilities for entertaining guests all the year round. The Company owns 4,000 acres at this point and has made it a most successful rival of the resorts hitherto more widely advertised.

This place is on the picturesque French Broad River, near the Tennessee line in a region of attractions in the way of scenery has especially to boast of its climate and healthfulness. Its altitude of 1,700 feet, freedom from fog, and pure dry air make it most desirable for the debilitated.

Mountain Park Hotel is new, with the best modern appliances. A quarter of a mile of broad verandas, excellent cuisine and service make it a most desirable home.

Roaring Gap.—Within the last few years Roaring Gap, Alleghany County, has attained the importance of a resort. A large and well arranged hotel has been built on a site commanding charming views and vistas. It is on the Blue Ridge at an elevation of 2,914 feet, and is reached over the Northwestern and North Carolina Railroad, a branch of the Southern system. Leaving the train at Elkin, a drive of sixteen miles brings you to the hotel.

Other Towns—Old Fort, Marion, Black Mountain and Morganton are all, more or less summer resorts. Morganton has occupied an enviable reputation as a resort for more than half a century, and is still much frequented; in fact all the towns in the mountain region may be classed as resorts, since each has an increasing number of summer visitors.

Taken all together this mountain region is a wonderful section; the late Col. J. B. Wheeler, United States Army, who had served all over the Union, used to remark that in no region with which he was

familiar could be counted in a year so many days when the sun shone. Bishop Lyman, who had lived for years in Rome and California was fond of saying all manner of gracious things of this region.

No part of the South offers greater attractions to the investor and the seeker for health or pleasure, or is more interesting to the student than this. Incalculably rich in minerals and timber, perfectly suited for growing grasses, cereals and fruits; with a climate bland, strong, stimulating and restful, it also has the purest strain of Anglo-Saxon blood in the country, and with the possible exception of Kent and Devon the purest in the world. Descendants of great houses famous under Plantaganet and Tudor, children of ancestors who flew from the tyranny of Stuart and Hanoverian, occupy slopes of the Appalachian chain, No Latin or Celtic admixture has dimmed the bright current which flows in the veins of the heirs of the gentry and yeomanry of the mother isle, and the scholar will observe the frequency with which, in the houses of men whose ancestors fought Charles at home and Ferguson here, he may listen to the unmatched English of Shakespeare.

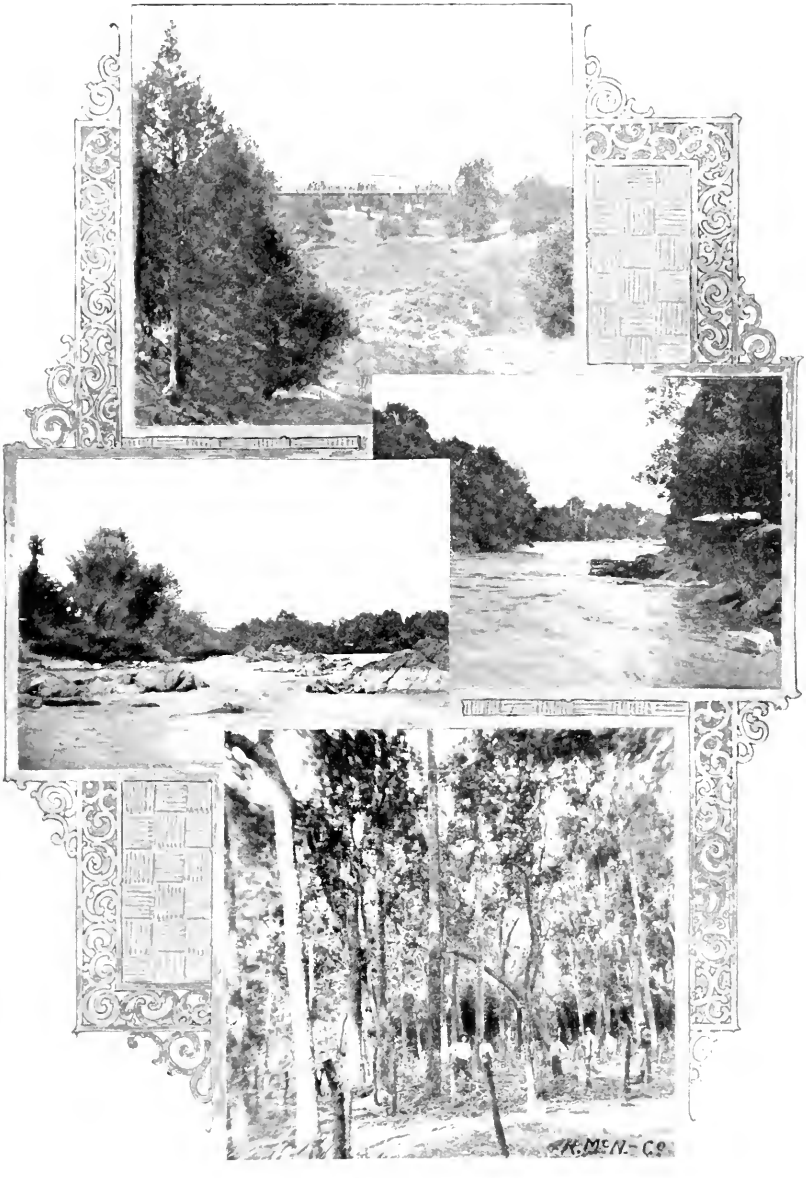
HUNTING AND FISHING.

Among all the States, North Carolina stands near the head as a resort for the hunter and fisherman, but among those within easy access of the centres of population and wealth, it undoubtedly possesses advantages equalled by no others. The fact that so ardent a hunter and fisherman as ex-President Cleveland selects the shores and sounds of North Carolina as his hunting ground (which, by the way, was sometimes the practice of his illustrious predecessors), and that the wealthy Eastern Field Club holds its annual trials on the stubble covered fields of the Piedmont region of the State, are significant proofs of the fact that "good hunting" may be had here.

Deer and bear are the representative big game animals found in North Carolina, and they are both sufficiently abundant to be an object of sport in the localities in which they abound, in fact, in some sections of the State, the bears often become a nuisance to the farmer on account of their depredations on the hog-pen and sheep-fold.

The Coastal Plain region, the land of the big swamps and pocosons, is the natural home of the bear, and almost any one of the extreme eastern tier of counties can still show good sport in bringing him to bay. The mountains of the west, too, produce some enormous specimens, and a good many of them, and many deer still roam unmolested among the peaks and valleys of the Blue Ridge and Great Smoky ranges. Deer are also plentiful in the Coastal Plain region of the State, as well as in the west, and are found in varying numbers all over, except perhaps, in a few of the older and more thickly settled counties. Wildcats are common in about the same sections that produce the bear and deer, and some wolves yet rouse the wrath of the sheep farmers in the mountain districts.

The stately wild turkey is yet a common bird nearly the whole length of the State, and fine specimens are killed frequently within a few miles of the State Capital at Raleigh. While not as common, of



ON ROANOKE RIVER—WELDON.

course, as formerly, yet it will be many years before this noble bird becomes even rare in North Carolina. They are abundant in many localities.

But it is, perhaps, as a wild fowl resort that we stand without a rival on the whole Atlantic seaboard. The enormous extent of the great sounds, estuaries, rivers, marshes and beaches of the tidewater region, makes it the home almost the whole year round of a greater number of more different kinds of waterfowl and shore-birds than, perhaps, can be found in any other like area on the American continent. In fall and winter it is the vast hordes of waterfowl on the sounds and open reaches that attract the hunter from afar, and, not infrequenly, large bags of canvas-back are the reward of his labors. Redhead, mallard and black duck, teal, widgeon and pintail all abound, while wild geese and brant are to be killed in numbers unheard of in less favored localities. The snow goose occurs here during winter in larger numbers than in any other locality on the Atlantic seaboard. The great white whistling swan is a common bird on the northern sounds, and, with the exception of a few arctic and sub-arctic species, about all the members of the duck family known along the western shores of the Atlantic Ocean occur, usually abundantly, on the North Carolina sounds. In spring and fall, too, the beaches and marshes are the resort of innumerable shore and marsh birds.

Bob-White, the quail of the North and the partridge of the South, is found nearly everywhere except on the mountain peaks, but is perhaps most plentiful in the Piedmont Plateau Region. But anywhere in the State from the tidewater region of the east to the foot hills of the west, Bob-White is thoroughly at home, and lots of him too. Of all land game birds of the State, in his ability to take care of himself, to exist through extremes of both summer and winter temperatures, to thrive and grow fat on what he can pick up and to furnish the best of sport to the most exacting gunner, Bob-White stands pre-eminently first. Bags of twenty-five to fifty are not uncommon with our best gunners, and occasionally even larger bags are made.

In the upper waters of the cold and sparkling streams that have their source all through the Mountain Region of the State, the brook trout abounds and is here, as elsewhere, the same dashing, gamey sprite of the waters whose rise to the fly will always cause the nerves of even the veteran angler to tingle. The rainbow trout of the west has also been introduced in these streams. Black bass of fair size and large fighting capacity are also caught a little lower down, while the Piedmont Plateau Region yields some excellent still water fishing for bass, sunfishes of several kinds, pike and perch.

Trolling for bluefish and spanish mackerel may be indulged in to a surfeit, and some of the finest sail boats for this sport, fully equipped with lines and bait can be found for hire at many points along our coast. An occasional king fish or sero (scomberomorus cavalla) of from fifteen to twenty-five pounds weight will vary the monotony of hauling in the beautiful mackerel; but the lucky fisherman to whose line such a prize comes does not get him to the boat without some hard work and skill, too.

Still fishing for gray and speckled trout (cynoscion regalis and c. nebulosus) known further north as weakfish, is a fascinating sport and is very productive almost anywhere along the whole line of our coast, and along with the trout are caught sea bream, croakers, sea cats, spots and many others, in large numbers. Sheepshead of large size are caught in the neighborhood of old wrecks and around wharves and old piles where they resort to feed on the flinty shelled barnacles growing thereon, and it may be remarked, in passing, that it takes a sheepshead's mouth, with its broad incisors and millstone grinders, to properly crush the stony envelope that encloses the juicy barnacle. Of course, many other kinds of salt water fishes than those enumerated may be and are taken, often in some numbers, by the angler, but the space allotted to this article forbids further details.

In the large bodies of fresh and brackish water and their tributaries, near the eastern seaboard, including some of the larger sounds and lakes, may be had some of the best fresh water fishing in the country. Striped bass of enormous size occur in numbers and afford excellent sport. Pike, two species, pike perch, speckled perch or strawberry bass, white perch, several species of the sun perches, etc., are all caught in quantities by the local fisherman on the rudest kind of tackle; what might then be done with the improved tackle of the up to date angler? But beyond all of the foregoing, the noble black bass swims to the front. Both species—the large mouthed and small mouthed—occur, and it is no exaggeration to call the black bass really plentiful throughout this region. It runs to a large size, too, six and seven pound specimens being by no means uncommon, while eight to ten pounders occasionally occur. To give some idea of the abundance of these species, it may be noted that in 1890—the latest available statistics—the catch for market in one county alone was upwards of 335,000 pounds, a catch that could hardly be equalled by other like area in the country.

As Dr. J. A. Henshall, the greatest living authority on the subject, says, "I consider him inch for inch and pound for pound, the gamest fish that swims." Our black bass is known locally as "chub" and "welshman" and in the extreme southern part of the State he is even called a "trout."

EDUCATION.

NORTH Carolina is well provided with educational facilities. Its University at Chapel Hill is the second oldest State University in the Union, and its roll of alumni includes many of the most eminent names in American history. The State College of Agriculture and Mechanic Arts at Raleigh and the State Normal and Industrial College for women at Greensboro, although much younger and not so fully developed as the University, yet deserve to be ranked among the best institutions of their kind in the United States. The State institutions for the education of the blind and the deaf and dumb are ample in accommodation, progressive in method and thoroughly equipped for instruction.

All the larger cities and towns of the State are provided with public graded schools, most of them with public high schools, which furnish preparation for colleges and universities. Besides those institutions, there are 5,411 rural white schools and 2,418 rural colored schools in North Carolina wherein instruction is given during four months each year in reading, writing, spelling, grammar, history, arithmetic, geography, physiology and civil government.

It will be seen that the public school system of the State is quite comprehensive, and is adapted to training its citizens for all spheres of usefulness in life. The State also possesses a very considerable and excellent system of private schools and academies and church colleges. The celebrated Bingham School at Asheville is over a hundred years old, having passed from father to son through four generations. The Horner School at Oxford has existed similarly for over half a century in one family. Both of these schools have obtained a national reputation for efficient teaching. Many other academies have grown up in the last twenty-five years, and are now doing excellent work.

The church colleges of the State are unusually strong and progressive. A generous rivalry and an earnest desire to extend the benefits of higher education have steadily increased their endowment, their equipment and their patronage, until now they deserve to be ranked among the best colleges in the country.

Considered as a whole, it may be doubted whether any Southern State surpasses North Carolina in facilities for secondary and higher education. The public schools, of lower grade, are now being rapidly improved. Governor Charles B. Aycock, the first candidate for governor to make his campaign upon an educational platform, is organizing, as far as possible, all the forces of the State for the improvement of the lower public schools. In a few years, doubtless, they will be brought to a very high degree of efficiency.

The State makes provision for the education of the colored race not only in public schools of lower grade, which are maintained by the same system of taxation and under the same plan of supervision as those for the white race, but also in city graded schools, State normal schools, an agricultural and mechanical college and an institution for the deaf, dumb and blind. The State Agricultural and Mechanical College for the colored race is located at Greensboro, and is well equipped for instruction.

There are also a number of well equipped and well managed colleges for the colored race not under State control. The best of these are Shaw University and St. Augustine School, Raleigh, N. C.; Bennett College, Greensboro; Livingstone College, Salisbury, Biddle University, Charlotte.

LEADING COLLEGES AND ACADEMIES.

University of North Carolina.—Francis Preston Venable, Ph. D., President. Located at Chapel Hill. Incorporated 1789.

College of Agriculture and Mechanic Arts.—George Tayloe Winston, A. M., LL. D., President. Located at Raleigh. Chartered 1887.

State Normal and Industrial College.—Charles D. McIver, A. B.,

D. Litt., President. Located at Greensboro. Chartered 1891. Began work 1892.

Trinity College.—Rev. John C. Kilgo, D. D., President. Located at Durham. Incorporated 1851.

Wake Forest College.— Rev. C. E. Taylor, B. Litt., D. D., President. Located at Wake Forest. Chartered 1833.

Davidson College.—Professor H. L. Smith, A. M., Ph. D., President. Located at Davidson. Chartered 1835.

Elon College.—Rev. W. W. Staley, A. M., D. D., President. Located at Elon College. Chartered 1889.

St. Mary's School.—Rev. Theodore Bratton, D. D., Rector. Located at Raleigh. Established 1842.

Peace Institute.—Professor James Dinwiddie, A. M., Principal. Located at Raleigh. Founded 1837.

Elizabeth College.—Rev. Charles B. King, President; Julia Louise Abbott, Lady Principal. Located at Charlotte. Incorporated 1897.

Guilford College.—Lewis Lyndon Hobbs, A. M., President. Located in Guilford County. Incorporated as a college 1888.

Yadkin Collegiate Institute.—W. T. Tatton, A. B., J. F. Tatton, A. B., Principals. Located at Yadkin College. Chartered 1861.

Red Springs Seminary.—Rev. C. S. Vardell, President. Located at Red Springs. Incorporated 1897.

The Baptist Female University.—Rev. R. T. Vann, D. D., President. Located at Raleigh. Incorporated 1891.

Greensboro College.—Dred Peacock, President. Located in Greensboro. Chartered in 1838.

North Carolina College.—Rev. W. Lutz, President. Located at Mt. Pleasant. Chartered in 1855.

Weaverville College.—Rev. G. F. King, Principal. Located in Weaverville. Founded in 1873.

Claremont College.—Stuart P. Hatton, President. Located at Hickory. Chartered 1888.

Catawba College.—Charles H. Mebane, President. Located at Newton. Chartered 1851.

St. Mary's College.—Right Rev. George Haide, D. D., O. S. B., President. Located at Belmont. Founded in 1876.

Louisburg Female College.—M. S. Davis, President. Located in Louisburg. Established 1847.

Littleton Female College.—Rev. J. M. Rhodes, President. Located at Littleton. Established 1884.

Presbyterian College.—John R. Bridges, President. Located at Charlotte.

Davenport Female College.—Rev C. M. Pickens, President. Located in Lenoir.

Lenoir College.—Rev. R. A. Yoder, D. D., President. Located at Hickory.

Kinston College.—Dr. R. H. Lewis, President. Located at Kinston.

Salem Academy and College.—John H. Clewell, President. Located at Winston-Salem. Founded 1802.

Whitsett Institute.—William Thornton Whitsett, Ph. D. President. Located at Whitsett, Guilford County. Incorporated 1884.

Bingham School.—Col. Robert Bingham, A. M., LL. D., Superintendent. Located at Asheville. Established 1793.

Normal and Collegiate Institute.—Rev. Thomas Lawrence, D. D., President. Located at Asheville. Established 1892.

Oak Ridge Institute.—J. Allen Holt and Martin H. Holt, Principals. Located at Oak Ridge. Chartered 1852.

Horner's Military School.—J. C. Horner, Principal. Located at Oxford. Founded fifty years ago.

Bingham School.—Preston Lewis Gray, Principal. Located near Mebane. Established 1793.

Raleigh Male Academy.—Hugh Morson, Principal. Located at Raleigh.

Chapel Hill School.—John W. Canada, Principal. Located at Chapel Hill. Established 1896.

Buie's Creek Academy and Commercial School.—Rev. J. A. Campbell, Principal. Located at Buie's Creek.

Home Industrial School.—Florence Stevenson, Principal. Located at Asheville. Established 1887.

Cary High School.—E. L. Middleton, Principal. Located at Cary. Established 1896.

Francis Hilliard School for Girls.—Miss Margaret B. Hilliard, Principal. Located at Oxford.

Oxford Female Seminary.—Professor F. P. Hobgood, A. M., President. Located at Oxford. Founded 1850.

Cullowhee High School.—R. L. Madison, Principal. Located at Painter.

Turlington Institute.—Ira T. Turlington, Principal. Located at Smithfield.

Atlantic Collegiate Institute.—S. L. Sheep, President. Located at Elizabeth City.

Robeson Institute.—Professor Ackerman, Principal. Located at Lumberton.

Trinity Park High School.—J. F. Bivens, Headmaster. Located at Durham.

Raeford Military School.—W. P. M. Curry, Principal. Located at Raeford.

Warrenton High School.—John Graham, Principal. Located at Warrenton.

Union Home School.—John E. Kelly, A. M., Principal. Located at Victor.

PUBLIC SCHOOL SYSTEM.

Leaders of thought in North Carolina for more than a hundred years have advocated public schools for all the people. The first Constitution of the State was framed at Halifax, in 1776. That Constitution contained a declaration that the salaries of the masters of schools should be paid by the public.

Early in the last century Governor Miller called the attention of

the General Assembly to the question. A committee was appointed by that body to investigate and report a plan. Judge Archibald D. Murphy, of Orange County, was the chairman of the committee, and in 1817 he submitted a voluminous report. That report antedated Horace Mann's appointment as Secretary of the Massachusetts Board of Education exactly twenty years, and in every particular it is the equal of the ablest report ever issued by Massachusetts' great apostle of education.

In 1838 a practical beginning was made under the leadership of Bartlett Yancey, of Person County, who had read law in the office of Judge Murphy. The work rapidly increased in force and efficiency, skillfully directed by Calvin H. Wiley, the first Superintendent of Public Instruction, who visited in his buggy every county in the State and stirred up an interest among the people on the subject of education, which is bearing fruit to-day. Of the educational movement of this period John Swett, of California, has recently written: "North Carolina secured a State school fund (1825-40) of two million dollars, and then distributed the annual income in aid of county district schools, thus making a nearer approach to common schools than any other Southern State. This State, too, was alone among the Confederate States in keeping her schools open during the war."

Of late years the tax rate has been steadily increased from six and one-quarter cents to eighteen cents on one hundred dollars of property, and, with constantly increasing valuation of property, the school revenues have been doubled in the past sixteen years while the school population has increased but twenty-seven per cent. The enrollment has also increased at a more rapid rate than the school population.

In addition to the public school revenue now levied by legislative enactment, amounting to about $1,100,000 annually, there is levied and collected a sum approximating $250,000 in the various cities and towns of the State for the better support of their graded schools. About thirty-five cities and towns now support such schools, open during the entire scholastic year. As yet, this movement is confined mainly to the towns, but within the past year a number of country school districts have taxed themselves for better school facilities, and a vigorous movement is now being made under the direction of Governor Aycock and the State Superintendent of Public Instruction, aided by the Southern Educational Board, to induce the people of the various villages and rural districts without public school facilities other than those afforded by the State Government to supplement the public school fund by a special local tax. A meeting called by Dr. Charles D. McIver, acting for the Board in North Carolina, was recently held in the Governor's office in Raleigh. It was attended by presidents of colleges, college professors, principals of academies, county superintendents of schools and graded school superintendents from all over the State. Without a dissenting voice, this conference passed resolutions urging the people to add largely to the school revenues by a special local tax. There is no doubt that in a few years hundreds of communities in the State will be enjoying the advantages of a good public school open for eight or nine months of the year.

At its last session, the Legislature passed an act providing for the establishment of rural school libraries. The sum of $5,000 was set apart for this purpose. The act provides that if the patrons and friends of any rural public school raise ten dollars for a library, the county school authorities shall appropriate ten dollars and the State Board of Education shall also appropriate ten dollars for the purchase of books. Although the law has been in force less than a year and although no county is entitled to more than sixty dollars of the State appropriation, there has already been drawn more than three-fifths of the entire amount of the State funds available. In the county of Durham, after the State appropriation for six libraries was exhausted, Col. Julian S. Carr generously furnished means sufficient to make such a library possible in every school district of the county.

The present school law wisely looks toward the building of better school houses, more efficient supervision and the consolidation of schools. The county Boards of Education are now entrusted with the duty of erecting school houses, to be paid for out of the general school fund of the county. They are authorized to pay the county superintendent of schools as much as four per per cent. of the county school fund. They are not allowed to establish a new school within three miles by the nearest traveled route of a school already established.

After all is said, however, better than increased school revenues and wiser laws, the most hopeful sign for our schools is the educational spirit in the State. The present Governor is North Carolina's Educational Governor in fact, as he will be in history, and from the executive office to many a humble home the talk is of schools and education. A few days ago the State was called upon to mourn the death of her honored superintendent of public schools. The sorrow over his death was deep and sincere even among those who did not know him, because they loved the cause so near his heart.

His successor, Prof. Jas. Y. Joyner, carries to the office of State Superintendent a rare combination of scholarship, consecration to lofty ideals, teaching experience, executive ability and common sense. He possesses the full confidence and the enthusiastic support of the teaching profession and the general public. His acceptance of the office of State Superintendent of Public Instruction and his administration of our public schools will mark an era in North Carolina school history.

THE CITY SCHOOLS OF NORTH CAROLINA.

There are in North Carolina thirty-four (34) cities and towns which have supplemented the regular school fund with local taxes and consequently have terms of nine or ten months each year.

In the following list will be found the names of these cities and towns and also of the Superintendents:

Asheville, R. J. Tighe.
New Bern, Harry P. Harding.
Goldsboro, Thomas R. Faust.
Raleigh, Edward P. Moses.
Charlotte, Alex. Graham.

Wilmington, Jno. J. Blair.
Statesville, D. Matt. Thompson.
Lexington, J. B. Spilman.
Rockingham, A. B. Hill.
Burlington, Frank H. Curtiss.
Mount Airy, Jeff Davis.
Albemarle, L. L. Stevens.
Wilson, E. P. Mangum.
Gastonia, Joe S. Wray.
Reidsville, W. Banks Doree.
Monroe, Eugene C. Brooks.
Oxford, R. D. W. Connor.
Durham, J. A. Matheson.
Selma, T. T. Candler.
Washington, Harry Howell.
Salisbury, Chas. L. Coon.
Henderson, J. T. Alderman.
Marion, E. E. Sams.
Hendersonville, R. M. Ivins.
Fayetteville, J. A. Jones.
Concord, C. S. Coler.
Sanford, D. L. Ellis.
Mount Olive, J. D. McWhorter.
Waynesville, W. C. Allen.
High Point, G. H. Crowell.
Rocky Mount, W. V. Boyle.
Tarboro, R. M. Davis.
Greensboro, E. D. Broadhurst.
Kinston, L. C. Brogden.

Establishment of the Schools.—The history of the establishment of these schools is a fair index to the educational growth of North Carolina and especially to the growth of the local tax idea.

It was only after strenuous and earnest effort on the part of a few enthusiastic advocates that the first graded schools in our cities were established.

It often required two or three elections to get the popular endorsement necessary for the collection of taxes to defray the running expenses. Prior to 1885 there were only seven of these communities which had adopted the principle of local taxation as the only means of securing satisfactory Public Schools. During the five years from 1885 to 1890, only three additions to the list had been made and during the ten years from 1890 to 1900 only ten additional communities had rated a special tax—or an average of about one for each year.

The year 1901 will always be looked upon as a bright and encouraging one in the educational history of North Carolina, for in this year twelve (12) cities and towns provided adequate school facilities by voting adequate school funds for the support of their schools. Not a single election was lost to schools during this year.

This means that North Carolina did great things for the develop-

ment of her latent intellectual power in 1901. Guided and inspired by these examples our State is at last ripe for a great educational awaking, and what is, if possible, of more practical importance, all our citizens are fully convinced that local taxation is the only means by which an efficient system of schools can be built up.

Enrollment of the City Schools.—There are enrolled in these schools at the present about 31,880 children. While this does not mean that this number is in the schools every day, it does, however, mean that during a part of the session at least the above number of children come in contact with cultured and trained teachers.

Course of Instruction.—In almost all of the graded schools it requires ten full years of work to complete the course of study. In many it requires eleven years, and some few demand twelve years' work before granting a certificate.

The following are some of the subjects taught in the high school departments:

Latin, grammar, composition and reading and translation of Caesar, Cicero, Virgil and some other authors.

Arithmetic, algebra and geometry, botany, zoology, physics and chemistry.

English history, Roman and Grecian history, United States history.

English and American Literature.

In almost all of the schools some form of manual training is taught and in a few cases a special director is employed to supervise this work.

Libraries.—Recognizing the importance of cultivating a taste for the reading of good, wholesome books the graded schools have provided themselves with small, well selected libraries from which the pupils are permitted to borrow books.

The movement in many of our cities for large, well equipped public libraries originated with the small collection of books found in the schools.

The books borrowed from the schools were eagerly read in the homes of the children and added brightness and good cheer to them. It was only one step in advance of this to provide more books where every one in the community could be supplied with good reading without any charge whatever.

Financial.—For actual running expenses the thirty-four systems of schools spend annually about $287,200. Of course the per capita from the general fund is paid each year, but by far the major part of this revenue is raised by local taxation.

In addition to the above amount large sums are spent annually on improved equipment. During the past two years $395,000 were expended upon buildings and permanent improvements.

The city schools of North Carolina have always been educational beacons, pointing the State to better things. The affairs have been wisely administered by local Boards which have always required a high decree of efficiency on the part of superintendent and teachers.

While the process has been a long and tedious one the impression has at last been made upon the State by the wise management and

efficiency of the city schools. We confidently look for our rural communities to adopt the same principle. In fact several have already done so and we expect to multiply the number by at least one hundred within the next few years.

The following sketches of the University and the five leading colleges of the State have been supplied by the Presidents of their respective institutions:

THE UNIVERSITY OF NORTH CAROLINA.

The University of North Carolina was ordained of the people in the first Constitution of the State, adopted in 1776, and received the grant of a charter from the Legislature in 1789. It is, therefore, the oldest State University in the Southern States. The development and expansion of the University have been most marked during the past ten years. Within that period the following advances have been made in the life of the institution:

1. Increase of enrollment from 248 to 565.
2. Increase of teaching force from 20 in 1891, to 52 in 1902.
3. Extension of elective system.
4. Establishment of Chairs of History, Pedagogy, Biology, Geology and Economics.
5. Extension of the Medical Course.
6. Extension and growth of the Summer School.
7. Establishment of the School of Pharmacy.
8. Erection of Commons Hall.
9. Admission of Women.
10. Erection of Alumni Hall and the Carr Building.
11. Establishment of the University Press.
12. Construction of the Water-works.
13. Erection of the Mary Ann Smith Building.
14. Establishment of Medical College at Raleigh.

The Value of University Training.—The practical value of University training is clearly shown in the lives of her sons, who have been leaders in every great movement in the State and the entire South—political, social and industrial; in the pulpit, at the bar, in business, or in the councils of the State and Nation.

The list of eminent Alumni includes one President of the United States, two Vice-Presidents, ten Cabinet Officers, seventeen Ministers to Foreign Courts, fourteen United States and ten Confederate States Senators, twenty Governors of States, twenty-two Justices of the Supreme Court, sixteen Generals, four Bishops, eighteen College Presidents, fifty-nine Professors in Colleges and Universities.

Advantages offered by the University.—1. The largest and most costly equipment in the State. The present value is about $450,000.

2. The largest academic faculty in the South, besides excellent faculties in Law, Medicine and Pharmacy.

3. The University offers the highest courses and a greater number of them, giving a broad and liberal training.

4. The inestimable advantage of meeting students from all sections, various creeds and parties, and forming friendships which must tell for later success.

UNIVERSITY OF NORTH CAROLINA.
Showing some of the Ten Buildings.

5, "The thing that has been of most benefit to me all my life is the fact that I was a student at the University of North Carolina."—Zebulon B. Vance.

Location.—The University is situated in the town of Chapel Hill, near the geographic center of the State, and convenient of access to students from all sections, The climatic advantages are many.

Chapel Hill is situated on a branch of the Southern Railway. Two daily passenger trains connect at University Junction with trains to and from Greensboro and Raleigh.

Equipment.—The Library.—The University Library contains thirty-two thousand bound volumes and ten thousand pamphlets, and supplies material for general reading and special study in connection with work in the several departments of the University. It is open to students seven hours daily. Most of the departments have special libraries of practical working value. The reading-room is well supplied with magazines, papers and reviews. The accessions to the library amount to about two thousand volumes annually.

Facilities for Instruction in Science.—The University has well-appointed laboratories in Physics, Chemistry, Biology, Geology, Mineralogy, Pharmacy and Pathology. The equipment includes improved types of apparatus and supplies for experimentation and illustration of lectures. The students are provided with modern apparatus for observation and study. Each department also has a museum, containing collections illustrating the courses in scientific subjects. The departmental libraries contain books of reference, treatises and journals.

Societies.—The Literary Societies offer facilities for practice in debate, oratory, declamation and essay writing. Each society owns a large, well-furnished hall, the walls of which are hung with oil portraits of illustrious members. The societies for special culture, the Elisha Mitchell Scientific Society, the Philological Society and the Shakespeare Club, offer unusual facilities for original research and study. The North Carolina Historical Society is located at the University. Its work is open to all students and gives access to valuable historical material.

Campus and Buildings.—The University campus contains forty-eight acres of land, affording ample ground for buildings and for all sorts of athletic sports. There are, contiguous to the campus, five hundred acres of forest land, which is partly laid off into walks and drives. The University has fifteen buildings, which afford ample room for lecture halls, laboratories and dormitories. During the past two years the equipment of the University has been increased by the construction of three new buildings. The Carr Building, the gift of General J. S. Carr, of Durham, affords accommodation to eighty students with every modern convenience. The Alumni Building is one of the finest buildings in this State. It is used for offices of administration and for lecture rooms. A new dormitory, the Mary Ann Smith Building, contains forty rooms.

A system of waterworks has been installed, and is now in successful operation. This system furnishes an abundance of pure filtered water

at a pressure sufficient for distribution in all the buildings and for use in the laboratories, baths and dormitories. A hundred and eighteen thousand dollars have been expended in improvements during the past year.

Departments.—The University comprises the following departments:

The Academic Department.

The Graduate School.

The Law School.

The Medical School, first and second years at Chapel Hill, third and fourth at Raleigh.

The School of Pharmacy.

The Summer Schools.

Necessary Expenses.—The necessary expenses at the University are very moderate. It is believed that no other similar institution in the United States offers equal advantages at so small a cost.

The dues payable at the beginning of each of the two terms amount to $41.25.

The entire cost of living for a session of nine months at the University is about $200.

Students having scholarships or free tuition should deduct $60 from this total.

The fees for tuition in the professional schools are:

In Law, $37.50 per term.

In Medicine, $37.50 per term.

In Pharmacy, $30 per term.

Pecuniary Aid.—The income of certain bequests to the University affords eighty-four scholarships for meritorious students of slender means. There is, also, the Deems Fund, which provides loans for the very needy who show unusual merit. Twelve prizes, also, are offered in competition to students in the University.

The number of scholarships and loans is limited, but they are given, without reference to county or State lines, to students of talent, character and financial need.

Free tuition is given in the Academic Department to sons of ministers and candidates for the ministry, to young men under bodily infirmity, to public school teachers and those who intend to teach.

The Summer School for teachers begins on the 16th of June, and continues for three weeks. Instruction is given in methods and school management by experts and specialists. Certificates are awarded to teachers who complete the course.

Religious Interests.—The University, as a State institution, is non-denominational. The spirit of its instruction and college life is broad and sympathetic, but essentially conservative, devout, Christian. The religious influences in the University are manifold, active and well-directed. Morning prayers are held daily in Gerrard Hall. Attendance is required. Each month, also, a sermon is delivered by one of the University preachers. There are special courses of instruction in the English Bible, and lectures on Bible history are delivered each Sunday morning in Gerrard Hall. The Young Men's Christian Association meets four times each week, and assists in Bible study and Sunday-school work in the town and county.

Discipline.—The University endeavors to make young men manly and self-reliant, and develop character by educating the conscience. The discipline of the institution is administered upon a basis of honor and manhood in its students. Courtesy and consideration prevail in all relations, and the friction of the college life begets mutual regard, sympathy and respect between the teacher and taught.

Care of Students' Health.—The health of the students is the special charge of the Medical Department of the University. On payment of a small medical fee, all students receive the careful attention of the University physicians. They are by this arrangement relieved of the possible expense of large medical bills in case of prolonged illness, and parents may rest assured that their sons will have the best medical advice if they shall need it. The infirmary is comfortably furnished, containing improved equipment for the care of the sick. A competent nurse is in attendance in case of severe illness.

Labor and Self-Help.—It is confidently believed that no institution offers wider opportunities for self-help to meritorious students of slender means. Many students are now working their way through college by every form of honorable labor. A number are here as the result of money earned or borrowed. Fifty are aided by loans, and over nine hundred have received aid from the University in loans and scholarships in the past twenty years. A few students are selected by the authorities as waiters at Commons. Otherwise all opportunities, though available in the college and town, must be secured by the personal effort of the individual. They are not assigned by the President.

Athletics and Physical Training.—The University has excellent facilities for physical training. The gymnasium, Memorial Hall, is equipped with modern appliances for exercise, and is under the supervision of an experienced director.

The athletic interests are controlled by the students, with the advice and supervision of the faculty. In base ball, foot ball and track athletics, the University is one of the leaders among Southern colleges.

The University and the Public Schools.—The University is the logical head of the entire system of public educational institutions. It has always been foremost in fostering and developing the schools. For the last fifteen years nearly one-half of each graduating class has gone into the school service. There is a department of Pedagogy for the training of teachers and a Summer School for those who are already teaching and who are unable to attend its regular sessions. During the past year 250 students, who are teachers, or intend to teach, attended these schools.

Any further information about the University can be obtained by addressing the President, Dr. F. P. Venable, Chapel Hill, N. C.

THE NORTH CAROLINA COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

FOR INDUSTRIAL EDUCATION.

"*North Carolina possesses every element of wealth excepting skilled labor and technical knowledge. Give her these, and she will become the garden-spot of the earth.*"

"*The South is marching to the music of millions of spindles, wheels, and gears. Technically trained men are giving it the benefits of scientific training. With water-power of vast extent, with mines of coal and iron and mountains of limestone, with forests rich in rare and beautiful woods, with a climate adapted beyond all others for cotton, with splendid harbors and navigable water-ways, there is no reason why the South should not rival any part of the world in agriculture, commerce and manufactures.*"

"*A century ago education was for the few, and was designed to fit them for the learned professions; to-day education is for the many, and is intended to equip them for life's practical work.*"

The North Carolina College of Agriculture and Mechanic Arts was established to "to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." It is an institution where young men may fit themselves for work in any line of industry where training and skill are requisite to success.

It offers a complete technical education in Agriculture, Horticulture, Mechanical Engineering, Civil Engineering, Electrical Engineering, Chemical Engineering, Mining Engineering and the Textile Industry. It also offers thorough practical training in Carpentry, Wood-turning, Blacksmithing, Machinery-work, Mill-work, Boiler-tending, Engine-tending, Dynamo-tending, Dairying, Stock-feeding, Farm-drainage, Market-gardening, Floriculture, etc.

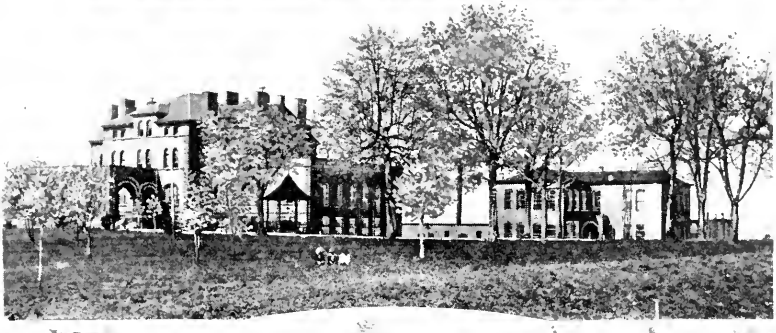
Although the leading purpose of the College is to furnish technical and practical education, yet other subjects essential to liberal culture are not omitted. Thorough instruction is given in English, Mathematics, History, Civics, Political Economy, Physics, Chemistry, Botany, Zoology, Physiology, Physical Geography and Geology.

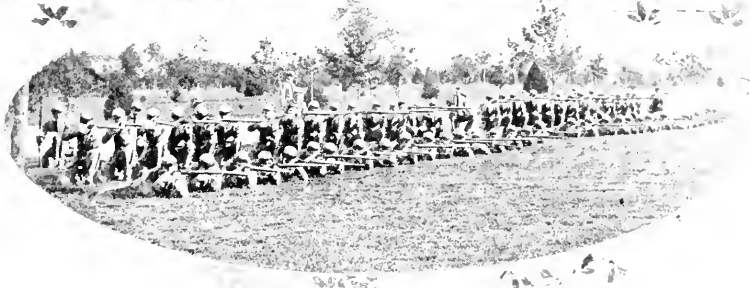
The College is intended, in short, to furnish a broad, liberal education and also to give at the same time such special technical instruction and practical manual training as are indispensable to industrial professions and occupations. It is not a place for young men who desire merely general education without manual or technical training, nor for lads lacking in physical development, mental capacity or moral fibre; nor for those that are unable or unwilling to observe regularity, system, order and economy in their daily lives and work.

Courses of Instruction.—The College offers the following Courses of Instruction:

I. Full (or Technical) Courses of four years, leading to degrees in:

1st. Agriculture (including Agriculture, Horticulture, Animal Industry, Dairying, Agricultural Chemistry and Botany.)





NORTH CAROLINA COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

2d. Engineering (including Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering and Chemical Engineering).

3d. Textile Industry (including Cotton Manufacturing, Designing and Dyeing).

These courses offer a combination of practical and theoretical work, about half of the time being devoted to lectures and recitations and the other half to work in the shops, laboratories, drawing-rooms; green-houses, dairies, fields and mills. They are intended to furnish both technical and liberal education. The Bachelor's degree is conferred upon any one who completes a Full Course.

II. Short Courses of two years in Agriculture, the Textile Industry, and the Mechanic Arts (including Carpentry, Wood-turning, Blacksmithing, Machinery work, Mill work, Boiler tending, Engine tending, and Dynamo tending).

The Short Courses include nearly all the practical work of the Full Courses, with less theoretical instruction. They are intended for students who desire chiefly manual training or for those who are unable to complete the Full Courses.

III. Special Courses, requiring about three months, in Agriculture, Carpenter work, Machine Shops, Engine tending, Boiler tending, Machine Drawing and Designing. The special courses are intended for persons of limited means, or limited opportunity, who desire special training in a single line.

Location and Equipment.—The College is beautifully located in the western suburbs of Raleigh, a mile and a quarter from the State Capitol. The site is suitable in all respects. There is an abundant supply of water from deep wells, and the natural slope of the land furnishes perfect drainage.

The College now owns six hundred acres of land and fourteen buildings, and its teaching force consists of thirty persons. The student roll numbers about 400. Its library contains three thousand volumes, and its reading-room is well supplied with popular, literary and technical journals. Both library and reading-room are accessible to students eight hours a day. There are also special reference libraries in connection with the various laboratories, drawing-rooms, and work-shops. The equipment for instruction is as follows:

In Agriculture: farm of 600 acres, barns, silos, tools, machinery, milk-herds (Jerseys, Guernseys, Holsteins), beef-herd (Aberdeen, Angus) dairy building with complete dairy apparatus, testers, separators, churns, butter-workers, etc. Swine (Poland-China and Berkshire) and poultry.

In Horticulture: Horticultural farm (23 acres), barns, silos, stock, machinery, five green-houses, grape-house, laboratory, plant collections, etc., etc.

In Botany: Laboratory, herbarium, seed collections, and green-houses.

In Engineering: All instruments for field work in civil engineering; drawing and designing rooms; machine shop with tools, machines; wood shop for carpentry, lathe work and pattern work; forge shop;

mechanical engineering laboratory; electrical engineering laboratory; physical laboratory; electrical machinery and apparatus; mechanical machinery and apparatus.

In Chemistry: Laboratories, apparatus and library.

In Cotton Manufacturing: Textile building for dyeing, weaving, designing, cording and spinning, etc., equipped with $25,000 worth of mill machinery.

Demand for A. and M. Graduates.—The graduates of this College are in great demand. In fact the students are frequently called away before graduation to accept lucrative positions in industrial enterprises. The demand far exceeds the supply. The rapid increase of manufactures, the application of electricity as power, the construction of railroads, the opening up of lumber and wood working industries, the development of dairying, trucking, stock raising, fruit growing, the various applications of chemistry in the industrial arts, the manufacture of machinery, the demand for mill superintendents, designers and dyers, the springing up, almost daily of new industries and the extension of old, have created in the South a very great demand for young men with industrial training. The College receives applications almost every week, not only from North Carolina, but from the Southern States generally, and the Northern too, for young men with manual skill and technological knowledge.

The President of the college is Geo. T. Winston, A. M., LL. D.; address, West Raleigh, N. C.

THE NORTH CAROLINA STATE NORMAL AND INDUSTRIAL COLLEGE.

The State Normal and Industrial College for women, located at Greensboro, was established by Act of the General Assembly of 1891, and began its work in October, 1892. It is supported mainly by the State but receives liberal aid from the Peabody fund, and has considerable revenue from tuition fees.

The purpose for which the College was created is thus set forth in Section 5, of the Act establishing it:

"The object of this institution shall be (1) to give to young women such education as will fit them for teaching: (2) to give instruction to young women in drawing, telegraphy, typewriting, stenography and such other industrial arts as may be suitable to their sex and conducive to their support and usefulness. Tuition shall be free to those who signify their intention to teach upon such conditions as may be prescribed by the Board of Directors."

The conditions prescribed by the Board of Directors for all applicants for free tuition are contained in the following agreement, which agreement each student applying for free tuition must sign:

"I seek the opportunities of the State Normal and Industrial College because it is my desire and intention to make teaching my profession, and I agree, in consideration of free tuition granted me, if I can secure employment and my health permits, to teach in the public or private schools of the State for at least two years after I leave the

College." Each applicant for free tuition is also required to pursue one of the four regular courses of study prescribed by the College authorities.

It is the general purpose of the institution to give such education as will add to the efficiency of the average woman's work, whatever may be her field of labor. To this end there are three distinct departments in the course of study, embracing the Normal Department, the Commercial Department, and the Domestic Science Department.

The Domestic Science Department receives recognition from the fact that the natural and proper position in life for the average woman is at the head of her own household, a position for which she is unqualified without some practical knowledge of those industries that pertain directly to the home and family.

The work of the Commercial Department is intended especially for those women who are thrown upon their own resources, but who do not care to teach.

The North Carolina State Normal and Industrial College is a part of the public school system and its chief mission is to prepare people to work in and to improve that system. The authorities of the institution recognize the fact that the chief factors of any civilization are its homes and its schools; that homes are made by women; and that it is in the home and from the mother that the child receives its earliest education and its first lessons in citizenship. The peculiar mission of the College and the cause of its existence may perhaps be best explained by a consideration of a few statistics. Who are the teachers of our children? The latest report (1899-1900)of the Commissioner of Education shows that of the 421,288 teachers employed in the common schools of the United States, over sixty-nine per cent. are women. It is, moreover, a steadily increasing per cent. having without exception grown larger while the per cent. of male teachers has grown smaller each year during the last decade. The same report also shows that of the total number of students in the schools of the United States 94.73 per cent. are in the elementary grades, grades taught almost exclusively by women while only 1.35 per cent. are to be found in the higher grades where male teachers find their principal field of labor. If, then, women are the teachers of all children in their earliest years, and of practically 94.73 per cent. of all the children in schools, the college which has for its prime purpose the fitting of women for the profession of teaching is surely not without a mission.

It is the belief of those who preside over the work of the North Carolina State Normal and Industrial College that the foundation equipment of a real teacher is accurate and thorough scholarship. With this in view the Normal Department seeks to give to its students the best literary and scientific education, including instruction in English and history, mathematics, natural science, ancient and modern languages, industrial art, vocal music and physical culture as well as work in the department of Pedagogy proper.

Four regular courses, of four years each, and one special course allowing special attention to instrumental or vocal music are prescribed by the College. Advanced courses of study, requiring in addition to

the four years' work already done, one year of residence study in prescribed subjects, are offered leading to degrees.

That the College is filling a long felt need in the State, and that it is in a measure fulfilling its mission, is shown by the fact that each year there have been more applicants for admission than the institution could accommodate, and this in spite of ever increasing dormitory facilities; that there is not a county in the State that has not been represented at the College, that over ninety per cent of all its graduates have taught or are now teaching in the schools of the State; that its students have been employed as teachers in almost every county of the State; that every important city school in North Carolina has employed or is now employing its graduates; and that each year sees an increased demand for its graduates as teachers in the public or private schools of the commonwealth.

During the ten years of its existence the institution has enrolled as matriculates a total of 2,211 students. The College has ample grounds, including a large park, numerous buildings, all modern and well equipped, a good library and proper laboratories. The faculty numbers 36 officers and instructors. Dr. Charles D. McIver is President.

DAVIDSON COLLEGE, DAVIDSON, N. C.

History—The Scotch Irish Presbyterians, who settled Piedmont Carolina a quarter of a century before the Revolution, brought with them their love of liberty, of religion, and of learning. The first culminated in the Mecklenburg Declaration; the second bore fruit in scores of vigorous churches and generations of godly men and women; the third led to the establishment of numerous high grade classical academies, and a half century later burst into flower in the founding of Davidson College. Their patriotism, religion and love of learning are blended in every word of the motto on the college seal, "Alenda lux ubi orta Libertas."

The originator of the movement was Rev. Robt. Hall Morrison, D. D., at the spring meeting of Concord Presbytery, in 1835. The Presbyteries of Bethel and Morganton a few months later added their strength to that of Concord, the churches in their poverty soon raised over $30,000 for the new institution, and on March 1st, 1837, Davidson College began its career, with 66 students in attendance, and Dr. Morrison as its first president.

In 1855 Maxwell Chambers, of Salisbury, bequeathed to the College a residuary legacy of a quarter of a million dollars. The stately main building was soon erected at a cost of $85,000, expensive apparatus and cabinets were purchased, new members were added to the Faculty, and the College had entered upon a new era of prosperity and influence when the Civil War called most of its students to the front.

The regular exercises of the College were never intermitted during the war, though its students were mainly boys too young to bear arms, but of her munificent ante-bellum endowment of $260,000 only one-fourth survived the financial ruin of the South. Ever since this overwhelming loss, the college has had to make up in zeal, untiring labor, and heroic self-denial what she lacked in worldly wealth.

Since the war the endowment has slowly grown to about $125,000, and the college has gone steadily onward with its work, training Southern leaders in church and State, at peace with its denominations and all other institutions of learning, standing always for genuineness, thoroughness, and unremitting study, in an age of educational shams, easily won degrees, and suicidal zeal for numbers, and giving to her students that liberal hard-won Christian culture which leads to broadened vision, intellectual self-reliance and spiritual power.

Equipment.—The College owns 17 buildings, the largest one costing $85,000. The total cost of the buildings and apparatus is nearly $200,000, and the College has an invested endowment of over $125,000. Its Y. M. C. A. hall was the first ever erected on a Southern campus. Its physical laboratory took the first X-ray photograph south of Baltimore, and owns the largest and most powerful X-ray coil in the State. The first wireless telegraph outfit ever brought to the State was purchased by Davidson and no college or university in this section of country has a chemical laboratory equal in size and equipment to the Martin Chemical Hall, completed last year.

The College library contains about 15,000 carefully selected volumes, and the cabinet 11,000 minerals, shells, and fossils.

The College has athletic grounds, numerous tennis courts, a gymnasium with competent director, a complete set of anthropometric apparatus, and ample bath rooms, with hot and cold water, open to students at all hours without charge. A complete system of waterworks supplies all college buildings and students boarding houses with an abundance of water, from flowing artesian tube-wells, declared by the State Bacteriologist to be the purest drinking water ever tested in his office.

A handsome new building, the Shearer Biblical Hall, has just been completed. It contains an Assembly Hall, with a seating capacity of 500, a commodious and well furnished reading room for the students, and several recitation rooms and administrative offices.

Each Literary Society has its own building, and each Fraternity its own handsomely furnished rooms. The campus is a 20-acre lawn of blue grass shaded by hundreds of stately oaks and elms.

Faculty.—The teaching force at Davidson consists of eight full professors, a thoroughly competent gymnasium director, and four tutors and laboratory assistants. The members of the faculty are young men, only one having passed middle age, and are in full sympathy with the young men under their care. Six of the eight are Ph. D.'s of Johns Hopkins and the University of Virginia; the seventh completed all the courses at Johns Hopkins for the same degree, but was called away before finishing his thesis, and the eighth is an ante-bellum M. A. of the University of Virginia. There is probably not another college or university faculty, North or South three-fourths of whose members (practically seven-eighths) are Doctors of Philosophy from such Universities.

Each member of the faculty was a professional teacher before taking his university degree, and every one is an earnest, active Christian, laying his learning and talents at the foot of the Cross.

The social and official relations of the students and Faculty are most pleasant and cordial, and the homes of the professors are always open to student visitors.

The College Atmosphere.—The moral tone of the Davidson campus is unsurpassed. Its students are the very flower of Southern Presbyterianism, coming from homes where culture and Godliness have been an inheritance for generations. Hazing, drunkenness, immorality, etc., have for some years been almost unknown, and last year, from September till June, not a single case of discipline engaged the attention of the Faculty. It is by no means claimed that no unworthy students are ever matriculated, or that a new student cannot find evil companions, but where on an average, nine out of every ten students are consistent church members, this element is unusually small. Three years ago, when the session closed, only one in twenty-five was not a member of the church.

Yet neither Faculty nor students believe in "goody-goody-ness," nor in ascetic dyspeptic, flabby-muscled Christianity. One-third of the students are regular foot-ball players. The College team last year won seven out of eight inter-collegiate games, and every form of athletic exercise and clean manly sport is encouraged by the Faculty. Never in its history has the Davidson team been accused by a defeated eleven of any form of unfairness or foul play, nor has any rumor of misconduct while away from College ever reached the ears of the Faculty.

Davidson has no suicidal zeal for mere numbers. No dishonorable, vicious or incorrigibly idle student will be permitted to remain in the institution, nor will the Faculty, knowingly, admit such to matriculation.

WAKE FOREST COLLEGE.

The location is sixteen miles north of Raleigh, on the line of the Seaboard Air Line Railroad, and in a high, gently rolling, and healthy country district. The proximity to the Capital of the State affords many of the advantages, without the moral dangers, of city life. The little town of Wake Forest and the surrounding neighborhood are as free from evil influences as any in the world.

History.—The College was founded in 1833 by the Baptist State Convention. The development of a great institution of learning, like the growth of many other healthful organisms which are destined for long life, is, in many cases, slow and gradual. This wasillustrated in the earlier history of Wake Forest College. It has passed through several distinct stages of growth. Each has been characterized by peculiar features, but no one of them has been lacking in abounding usefulness. The earlier years of the College were clouded by financial embarrassment. The funds available as endowment, however, now amount to more than $250,000. Five large and commodious buildings are conveniently located in a beautiful campus of twenty-five acres.

Organization.—The College is organized into fourteen distinct "schools." The excellence of this plan has been demonstrated by long and thorough testing. In the arrangement of courses leading to the degrees of Bachelor of Arts and Master of Arts the elective principle

has been so guarded as to make it impossible for a student to make eliminations which would be fatal to thorough or extended scholarship. Extended laboratory work is required in the schools of Biology, Chemistry and Physics.

The library contains sixteen thousand volumes representing most of what is standard in all the departments of literature and science. More than one hundred magazines, reviews and newspapers are regularly on file in the reading room. Physical Culture is required daily of all students. Ample facilities for this are afforded in the new gymnasium, one of the largest and best in the South. Here also are ample baths for the use of students. The Literary Societies are well sustained and contribute no little to the training of their members. Their halls are admirably adapted for their use and are elegantly furnished.

Expenses are as small, in proportion to advantages offered, as at any college in the country. Furnished rooms and service are provided by the College, though many students prefer to room in the private homes of the town. Excellent clubs, controlled by students, but managed by ladies, furnish table board at surprisingly low rates.

The College has a corps of twenty professors and instructors. The number of students enrolled in the last catalogue was three hundred and seven.

The Post Office is Wake Forest, N. C.

TRINITY COLLEGE.

Trinity College is located in the city of Durham, N. C., a town noted for its manufacturing and business enterprises. During the past ten years nearly eight hundred thousand dollars have been invested in the endowments, equipments, and other improvements of the College. The growth of Trinity has been remarkable. Large amounts of money are annually donated to its further development, and it is the aim of the authorites to perfect it in every line of college work.

The policy of Trinity is broad, seeking to create a spirit of sincerity and accuracy in scholarship, loyalty and freedom in citizenship, aggressiveness and energy in business, purity and progress in society, and tolerance and truth-loving in religion. As a college, it is kept in relation to all the serious problems of life, and strives to make a direct contribution to the progress of a sound civilization.

The educational standards and methods are in the interest of the highest intellectual and religious culture. The courses of study are fixed in accordance with this ideal. Short courses of a convenient nature are not offered, and the entrance requirements are such as to prevent students unprepared for college work from becoming members of the College. More than twenty-five per cent. of Trinity's graduates enter the larger universities of this country and pursue lines of advanced study.

The growing influence of Trinity College is evident in the increasing number of students who come from other States and other coun-

tries. It is fast becoming the de-localized college of the South Atlantic States, and more and more the embodiment of a cosmopolitan spirit and influence.

The annual cost to the student is remarkably small. At colleges of like ranking in the East, the charges are more than twice as large. Young men of limited means find at Trinity an opportunity to secure a college training, and many are meeting the cost of their education by their own efforts.

During the past few years some of the largest business organizations in America have secured Trinity men for the most responsible positions, thus testifying to the wisdom of keeping college work and sympathies in direct relations to all problems. The demand for Trinity graduates is much beyond the supply, and is an answer to the unfair criticism of the business unfitness of the college graduate.

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